APPENDIX D

COST ESTIMATING WORKSHEETS USED TO ESTIMATE THE COSTS OF CLOSURE OF TANK SYSTEMS

	IG WORKSH N PLACE AT		

Facility Name: 500 Gallons - Left in Place

	SUMMARY WORKSHEET				
of closure might into effect clo	Activity Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number				
1.	Removal of Waste	TS-3	107		
2.	Tank System Purging (ignitible wastes only)	TS-4			
3.	Flushing the Tank and Piping	TS-5	107		
4.	Disassembly and Loading	TS-6			
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	239		
9.	Sampling and Analysis	TS-11	2,541		
10.	Transportation	TS-12	1,088		
11.	Treatment and Disposal	TS-13	1,477		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		5,559		
13.					
14.	Certification of Closure	TS-14	3,640		
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			9,755		
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			1,951		
TOT	AL COST OF CLOSURE (add lines 15 and 16)		\$11,706		

INVENTORY - Page 1 of 2

The information entered in this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the cost of closure for tank systems. If the design characteristics of the tank system to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures, soils, and materials to be removed. Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete all sections of this inventory worksheet.

	UNIT DESCRIPTION AND MAXIMUM PERMITTED CAPACITY Describe the unit to determine the cost of the activities to be conducted to close it.				
Describe	e the unit to determine the cost of the activ	/ities t	o be conducted to o	close it.	
1.A	Type of tank system (aboveground or on-ground) ^b				
1.B	Maximum permitted capacity of tank	500	gal		
1.C	Total length of ancillary piping	7.1	ft		
1.D	Maximum capacity of ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the capacity of ancillary piping)	1	gal		
1.E	Maximum capacity of tank and ancillary piping (Add lines 1.B and 1.C)	501	gal		
1.F	Type of secondary containment system		Double-wall tank Vault Lined containment Other (explain)	t system (external to ta	nk)
2 INTERIC	OR SURFACE AREA OF TANK SYSTEM				
Determi	ne the interior surface area of the tank sys	tem to	determine costs of	decontamination.	
2.A	Interior surface area of tank (Refer to Page 4 of 5 of this worksheet for guidance on estimating the interior surface area of a tank.)	94.0	ft²		
2.B	Ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the interior surface area of ancillary piping.)	3.8	ft²		
2.C	2.C Surface Area of Tank System (Add lines 2.A and 2.B)				ft²
2.D	Surface Area of Tank System in yd ² (Divi	de line	2.C by 9)	10.9	yd²

INVENTORY - Page 2 of 2

3 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Determine the surface area of the secondary containment system pad to calculate costs for decontaminating and demolishing the pad. Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure.

3.A	Length	ft		
3.B	Width	ft		
3.C	3.C Surface Area of Secondary Containment System Pad (Multiply line 3.A by line 3.B)			ft²
3.D				yd²

4 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Calculate the volume of the secondary containment system pad to determine the cost of removing the pad. Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure.

4.A	Thickness	ft	
4.B	Thickness in yards (Divide line 4.A by 3)	yd	
4.C	Volume of Secondary Containment System Pad in yd ³ (Multiply line 3.D by line 4.B)		yd³

5 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM BERM

Calculate the interior surface area of the secondary containment system berm, or curbing, to determine the cost of decontaminating and demolishing the berm. Demolition of the secondary containment system berm is an additional activity that might be conducted if the owner or operator intends to demolish the berm at the time of closure.

5.A	Length	ft	
5.B	Height	ft	
5.C	Surface Area of Secondary Containment line 5.A by line 5.B)	ft²	
5.D	5.D Surface Area of Secondary Containment System Berm in yd² (Divide line 5.C by 9)		yd²

- For example, if a secondary containment system pad is circular in shape rather than rectangular, the user would be unable to calculate the surface area of that pad using the method prescribed in section 2 of this inventory worksheet. Rather, the surface area of such a pad could be calculated using the equation πr^2 .
- Owners and operators of in-ground and underground storage tanks are not eligible to use standardized permits.

REMOVAL OF WASTE - Page 1 of 1

1	Maximum volume of waste to be removed from the tank and ancillary piping (Enter from worksheet TS-2, line 1.E)	501	gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hour ^b	\$		
4	Work rate required to remove waste from tank and ancillary piping ^c		work hr/gal	
5	Number of hours required to remove waste from tank and ancillary piping (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	1	work hrs	
	L COST OF REMOVAL OF WASTE FROM TANK G (Multiply line 3 by line 5) (Enter total on Works	\$107		

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to remove waste from the unit.
- Enter the estimated number of hours required to remove one gallon of waste from the tank system. If, for example, it will take 1 minute to remove each gallon of waste from the system, enter a work rate of 0.017 (1 divided by 60) for removing the waste. If an estimate of the total number of hours required to remove waste from the tank and ancillary piping has already been formulated, you may bypass this step and enter that number directly on line 5.

FLUSHING THE TANK AND PIPING - Page 1 of 2

1	Maximum capacity of the tank and ancillary piping (Enter from Worksheet TS-2, line 1.E)	501	gal	
2	Number of times tank and ancillary piping will be flushed (if unknown, assume 1)	1		
3	Total volume of flushing solution (Multiply line 1 by line 2)	501	gal	
4	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
5	Labor and equipment cost per work hour ^b	\$		
6	Work rate required to flush tank and ancillary piping ^c		work hr/gal	
7	Number of hours required to flush tank and ancillary piping (Multiply line 3 by line 6) (One hour minimum; round up to the halfhour)	1	work hrs	
8	Subtotal of labor and equipment costs to flush piping (Multiply line 5 by line 7)	tank and		\$107
9	Total volume of flushing solution (Enter from line 3). (The flushing solution generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B (for water-based flushing solution) or TS-12 and TS-13A (for a solvent solution) to calculate the transportation, treatment, and disposal cost. If the flushing solution is to be placed in drums, complete lines 10 through 12.)	501	gal	
10	Number of drums required to contain flushing solution (Divide line 9 by 55 gallons per drum; round up to the nearest whole number)		drums	
11	Cost of one drum	\$	/drum	
12	Cost of drums needed to contain flushing solution 11)	\$0		
	L COST OF FLUSHING OF TANK AND ANCILLAR 2) (Enter total on Worksheet TS-1, line 3)	RY PIPINO	G (Add lines 8	\$107

Remember to calculate costs for transporting, treating, and disposing of the wastes in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If the wastes are to be managed as a bulk liquid, use worksheet TS-13B.

FLUSHING THE TANK AND PIPING - Page 2 of 2

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to flush the tank system.
- Enter the estimated number of hours required to flush the tank system for every one gallon of flushing solution. If, for example, it will take 1 minute for every gallon of flushing solution to flush the tank system, enter a work rate of 0.017 (1 divided by 60) for flushing the tank and piping. If an estimate of the total number of hours required to flush the tank and piping has already been formulated, you may bypass this step and enter that number directly on line 7.

DECONTAMINATION SUMMARY SHEET - Page 1 of 1

Facility Name: 500 Gallons - Left In Place

D	DECONTAMINATION SUMMARY WORKSHEET				
	Activity	Worksheet Number	Cost (\$)		
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	TS-10A	239		
2.	Decontamination of Unit by Sandblasting	TS-10B			
3.	Decontamination of Heavy Equipment	TS-10C			
TOTAL COST OF DECONTAMINATION (Add lines 1, 2, and 3) (Enter total on Worksheet TS-1, line 8)			\$239		

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	97.7	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	3.0	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply I			\$202
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²) ^d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	391	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$202		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	31.4	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	1.0	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply I			\$37
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²) ^d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	126	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$37		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: 500 Gallons - Left in Place

	SAMPLING AND ANA SUMMARY WORKSI		
	Activity	Worksheet Number	Cost (\$)
1.	Drilling and Subsurface Soil Sampling & Analysis	TS-11B	
2.	Concrete Core Sampling & Analysis	TS-11C	
3.	Wipe Sampling & Analysis	TS-11D	508
4.	Surface Water/Liquid Sampling & Analysis	TS-11E	2,033
5.	Soil/Sludge/Sediment Sampling & Analysis	TS-11F	
TOTAL SAMPLING AND ANALYSIS COST (Add lines 1 through 5) (Enter total on Worksheet TS-1, line 9)			\$2,541

SAMPLE INVENTORY - Page 1 of 2

The information entered on this inventory worksheet will be used in completing the appropriate worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBEI	r of drilling and su	JBSURFACE SOIL SAMP	LES	
	be collected for each in		ne number of subsurface e total number of sample	
1	Number of Subsurface	e Soil Samples		
	Boring Diameter:			
		boreholes	samples/borehole	total samples
2 NUMBEI	R OF CONCRETE CORE	SAMPLES		
		mber of concrete core sa s to be collected in the b	amples to be collected foox provided.	r each individual unit.
2	Number of Concrete C	Core Samples		total samples
3 NUMBEI	R OF WIPE SAMPLES			
			s and the number of wip Imber of samples to be c	
3	Number of Wipe Samp	ples		
		locations	samples/location	1 total samples
4 NUMBEI	R OF SURFACE WATER	/LIQUID SAMPLES		
taken of liqu			ken on lakes, rivers, or p Record the total number	
4	Number of Aqueous S	amples		
		locations	samples/location	4 total samples

SAMPLE INVENTORY - Page 2 of 2

5 NUMBE	R OF SOIL/SLUDGE/SEE	DIMENT SAMPLES		
concrete ch	nips and the number of s		ken of surface soil, sludg e collected for each indiv I.	
5	Number of Nonaqueou	ıs Samples		
		locations	samples/location	total samples

WIPE SAMPLING & ANALYSIS - Page 1 of 1

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1	COLL	ECTING WIPE SAMPLES			
	1.A	Number of wipe samples to be collected (Enter from worksheet TS-11A, line 3)	1	samples	
	1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
	1.C	Labor and equipment cost per work hourb	\$		
	1.D	Work rate required to collect one sample ^c		work hr/sample	
	1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0	work hrs	
	1.F	Cost to Collect Wipe Samples (Multiply line 1.	\$91		
2	ANAL	YZING WIPE SAMPLES			
	2.A	Cost of analysis per sampling event for wipe samples (Enter from Page 2 of 2 of this worksheet)	\$139	/event	
	2.B	Number of sampling events	3	events	
	2.C	Cost to Analyze Wipe Samples (Multiply line 2	.A by li	ne 2.B)	\$417
	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet TS-11, line 3)				\$508

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.
- Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SURFACE WATER/LIQUID SAMPLING & ANALYSIS - Page 1 of 1

Surface water/liquid samples are grab samples taken from lakes, rivers, or ponds, and samples taken of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLL	ECTING SURFACE WATER/LIQUID SAMPLES			
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet TS-11A, line 4)	4	samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a		level of PPE	
1.C	Labor and equipment cost per work hourb			
1.D	Work rate required to collect one sample ^c	W	ork hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	4.0	work hrs	
1.F	1.F Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)			\$365
2 ANAI	YZING SURFACE WATER/LIQUID SAMPLES			
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	\$139	/event	
2.B	Number of sampling events	12	events	
2.C	Cost to Analyze Surface Water/Liquid Samples line 2.B)	(Multiply I	line 2.A by	\$1,668
WAT	AL COST OF COLLECTION AND ANALYSIS OF SER/LIQUID SAMPLES (Add lines 1.F to line 2.C) sheet TS-11, line 4)		ıl on	\$2,033

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect surface water/liquid samples.
- Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

TRANSPORTATION OF WASTE - Page 1 of 1

Depending on the activities being conducted, it may not be necessary to complete all sections of the transportation worksheet.

1 TRAN	ISPORTATION OF WASTE IN DRUMS			
1.A	Number of drums of waste		drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)		truckloads	
1.D	Cost to Transport Waste In Drums (Multiply lin	e 1.B b	y line 1.C)	\$
2 TRAN	ISPORTATION OF BULK LIQUIDS			
2.A	Gallons of liquid waste	501	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	1	truckloads	
2.D	Cost to Transport Bulk Liquid Waste (Multiply	line 2.B	by line 2.C)	\$1,088
3 TRAN	ISPORTATION OF BULK WASTE			
3.A	Number of waste debris boxes		debris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
3.C	Cost to Transport Bulk Solid Waste (assume of hauled on each truck) (Multiply line 3.A by line	s box can be	\$	
	AL COST TO TRANSPORT WASTE (Add lines 1. on Worksheet TS-1, line 10)	\$1,088		

TREATMENT AND DISPOSAL SUMMARY SHEET - Page 1 of 1

Facility Name: 500 Gallons - Left in Place

	SUMMARY WORKSHEET			
	Activity	Worksheet Number	Cost (\$)	
1.	Treatment and Disposal of Waste	TS-13A		
2.	Transportation and Disposal of Decontamination Fluids	TS-13B	1,477	
	COST OF TREATMENT AND DISPOSAL (Add littotal on Worksheet TS-1, line 11)	ines 1 and 2)	\$1,477	

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 1 of 2

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. gal gal gal gal gal	1,018 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D level of PPE	
3	Labor and equipment cost per work hourb	\$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon) ^c	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	1 work hours	
6	Subtotal of labor and equipment cost to pum to a holding tank (multiply line 3 by line 5)	p decontamination fluid	\$43
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	\$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	1 tanks	
10	Subtotal of tank rental costs (Multiply lines 7	, 8, and 9)	\$365
11	Removal cost per gallon of bulk liquid ^d	\$ /gal	
12	Subtotal of removal cost for bulk liquids (Mul	tiply line 1 by line 11)	\$1,069
	TOTAL COST TO TRANSPORT AND DISPO DECONTAMINATION FLUID AS A BULK LIG and 12) (Enter total on Worksheet TS-13, I	QUID (Add lines 6, 10,	\$1,477

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.
- Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already bee formulated, you may bypass this step and enter that number directly on line 5.
- d Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure	1	
2	Cost of certification of closure per unit ^b	\$	
	TOTAL COST OF CERTIFICATION OF CLC by line 2) (Enter total on Worksheet TS-1,		\$3,640

- Facilities closing multiple tanks in the same manner at the same time should incur cost of certification of closure only once.
- This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK LEFT IN PLACE AT CLOSURE - CAPACITY 500 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 500 Gallons - Left in Place -Ignitable Waste

	SUMMARY WORKSH	IEET		
	Activity			
of closure might into effect clo	forme of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, night intend or be required to conduct additional activities to offect closure at the unit. Worksheets for estimating the costs of uch additional activities are listed in italic type. Worksheet Number			
1.	Removal of Waste	TS-3	107	
2.	Tank System Purging (ignitible wastes only)	TS-4	40	
3.	Flushing the Tank and Piping	TS-5	107	
4.	Disassembly and Loading	TS-6		
5.	Demolition and Removal of Containment System	TS-7		
6.	Removal of Soil	TS-8		
7.	Backfill	TS-9		
8.	Decontamination	TS-10	239	
9.	Sampling and Analysis	TS-11	2,541	
10.	Transportation	TS-12	1,088	
11.	Treatment and Disposal	TS-13	1,477	
12.	Subtotal of Closure Costs (Add lines 1 through 11)		5,599	
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	560	
14.	Certification of Closure	TS-14	3,640	
15.	Subtotal (Add engineering expenses and cost of certificati closure costs) (Add lines 12, 13, and 14)	on of closure to	9,799	
16.	Contingency Allowance (approximately 20% of closure coexpenses, and cost of certification of closure) (Multiply lin	osts, engineering ne 15 by 0.20)	1,960	
TOT	AL COST OF CLOSURE (add lines 15 and 16)		\$11,759	

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	501	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	1.5	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (Multiply I	line 2 by line 3)	\$8
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	1.0	work hrs	
9	Labor cost to purge tank system (Multiply line	6 by line	e 8)	\$32
TOTAL COST OF TANK SYSTEM PURGING (Add lines 4 and 9) (Enter total on Worksheet TS-1, line 2)				\$40

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST	ESTIMATI TANK REN	NG WORKSI MOVED AT (HEETS FOR C CLOSURE - C	CLOSURE OF A	. TANK SYSTEM GALLONS

Facility Name: 500 Gallons - Removed at Closure

SUMMARY WORKSHEET			
	Activity		
of closure might into effect clo	the activities listed below are conducted routinely as part e of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of itional activities are listed in italic type.	Worksheet Number	Cost (\$)
1.	Removal of Waste	TS-3	107
2.	Tank System Purging (ignitible wastes only)	TS-4	
3.	Flushing the Tank and Piping	TS-5	107
4.	Disassembly and Loading	TS-6	112
5.	Demolition and Removal of Containment System	TS-7	
6.	Removal of Soil	TS-8	
7.	Backfill	TS-9	
8.	Decontamination	TS-10	239
9.	Sampling and Analysis	TS-11	2,541
10.	Transportation	TS-12	1,088
11.	Treatment and Disposal	TS-13	1,477
12.	12. Subtotal of Closure Costs (Add lines 1 through 11)		
13.			
14.	Certification of Closure	TS-14	3,640
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			9,878
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			1,976
TOT	\$11,854		

DISASSEMBLY AND LOADING - Page 1 of 2

This worksheet can be used to determine the costs of disassembling and loading above ground or onground tanks and ancillary piping. $^{\rm a}$

1 DISA	1 DISASSEMBLY OF ANCILLARY PIPING				
1.A	Length of ancillary piping to be disassembled (Enter from worksheet TS-2, line 1.C)	7.1	ft		
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	level of PPE		
1.C	Labor and equipment cost per work hour ^c	\$			
1.D	Work rate required to disassemble one ft of pipe ^d		work hr/ft		
1.E	Number of hours required to disassemble ancillary piping (Multiply line 1.A by line 1.D) (One hour minimum; round up to the halfhour)	1.5	work hrs		
1.F	Cost to Disassemble Ancillary Piping (Multiply	line 1.C I	by line 1.E)	\$67	
2 LOAI	DING				
2.A	Capacity of tank (Enter from worksheet TS-2, line 1.B)	500	gal		
2.B	Level of PPE assumed for this activity (protection level D, C, or B) ^b		level of PPE		
2.C	Labor and equipment cost per work houre	\$			
2.D	Work rate required to load tank per gallon		work hr/		
	capacity ^f		gal capacity		
2.E	Number of hours required to load tank (Multiply line 2.A by line 2.D) (One hour minimum; round up to the half-hour)	1.0	gal capacity work hrs		
2.E 2.F	Number of hours required to load tank (Multiply line 2.A by line 2.D) (One hour			\$45	

DISASSEMBLY AND LOADING - Page 2 of 2

- Owners and operators of in-ground and underground tank systems are not eligible to use standard permits.
- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to disassemble ancillary piping.
- d Enter the estimated number of work hours required to disassemble one foot of ancillary piping. If, for example, it will take 10 minutes to disassemble each foot of ancillary piping, enter a work rate of 0.167 (10 divided by 60) for disassembling the piping. If an estimate of the total number of hours required to disassemble the piping has already been formulated, you may bypass this step and enter that number directly on line 1.E.
- Enter the estimated cost per work hour of all labor and equipment needed to load components of the onground or aboveground tank system. In addition to costs for labor, this cost should include the average cost per work hour of rental of all equipment and purchase of all supplies needed to conduct this activity.
- Enter the estimated number of work hours per gallon of capacity required to load the components of the on-ground or aboveground tank system. If, for example, it will take 1 minute for every gallon of capacity to load components of the tank system, enter a work rate of 0.017 (1 divided by 60) for loading the system. If an estimate of the total number of hours required to load the tank system has already been formulated, you may bypass this step and enter that number directly on line 2.E.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK REMOVED AT CLOSURE - CAPACITY 500 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 500 Gallons - Removed at Closure -Ignitable Waste

SUMMARY WORKSHEET			
	Activity		
of closure might into effect clo	the activities listed below are conducted routinely as part e of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of itional activities are listed in italic type.	Worksheet Number	Cost (\$)
1.	Removal of Waste	TS-3	107
2.	Tank System Purging (ignitible wastes only)	TS-4	40
3.	Flushing the Tank and Piping	TS-5	107
4.	Disassembly and Loading	TS-6	112
5.	Demolition and Removal of Containment System	TS-7	
6.	Removal of Soil	TS-8	
7.	Backfill	TS-9	
8.	Decontamination	TS-10	239
9.	Sampling and Analysis	TS-11	2,541
10.	Transportation	TS-12	1,088
11.	Treatment and Disposal	TS-13	1,477
12.	12. Subtotal of Closure Costs (Add lines 1 through 11)		
13.			
14.	Certification of Closure	TS-14	3,640
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			9,922
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			1,984
TOT	\$11,906		

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	501	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	1.5	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply	line 2 by line 3)	\$8
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	1.0	work hrs	
9	Labor cost to purge tank system (Multiply line 6 by line 8)		\$32	
	TOTAL COST OF TANK SYSTEM PURGING (Add lines 4 and 9) (Enter total on Worksheet TS-1, line 2)			\$40

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMATI TANK LEFT	ING WORKSHEETS FO IN PLACE AT CLOSUR	OR CLOSURE OF A T RE - CAPACITY 1,000	ANK SYSTEM GALLONS

Facility Name: 1,000 Gallons - Left in Place

SUMMARY WORKSHEET			
	Activity		
of closure might into effect clo	the activities listed below are conducted routinely as part e of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of itional activities are listed in italic type.	Worksheet Number	Cost (\$)
1.	Removal of Waste	TS-3	107
2.	Tank System Purging (ignitible wastes only)	TS-4	
3.	Flushing the Tank and Piping	TS-5	107
4.	Disassembly and Loading	TS-6	
5.	Demolition and Removal of Containment System	TS-7	
6.	Removal of Soil	TS-8	
7.	Backfill	TS-9	
8.	Decontamination	TS-10	378
9.	Sampling and Analysis	TS-11	2,541
10.	Transportation	TS-12	1,088
11.	Treatment and Disposal	TS-13	2,382
12.	12. Subtotal of Closure Costs (Add lines 1 through 11)		
13.			
14.	Certification of Closure	TS-14	3,640
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			10,903
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			2,181
TOT	\$13,084		

INVENTORY - Page 1 of 2

The information entered in this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the cost of closure for tank systems. If the design characteristics of the tank system to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures, soils, and materials to be removed. Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete all sections of this inventory worksheet.

1 UNIT DESCRIPTION AND MAXIMUM PERMITTED CAPACITY					
Describe	e the unit to determine the cost of the activ	vities to be cor	nducted to d	close it.	
1.A	Type of tank system (aboveground or on-ground) ^b				
1.B	Maximum permitted capacity of tank	1,000	gal		
1.C	Total length of ancillary piping	14.2	ft		
1.D	Maximum capacity of ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the capacity of ancillary piping)	2	gal		
1.E	Maximum capacity of tank and ancillary piping (Add lines 1.B and 1.C)	1,002	gal		
1.F	Type of secondary containment system	Vault Lined (e-wall tank containmen (explain)	t system (external t	o tank)
2 INTERIO	OR SURFACE AREA OF TANK SYSTEM				
Determi	ne the interior surface area of the tank syst	tem to determi	ine costs of	decontamination.	
2.A	Interior surface area of tank (Refer to Page 4 of 5 of this worksheet for guidance on estimating the interior surface area of a tank.)	149.0	ft²		
2.B	Ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the interior surface area of ancillary piping.)	7.7	ft²		
2.C	2.C Surface Area of Tank System (Add lines 2.A and 2.B)				ft²
2.D	2.D Surface Area of Tank System in yd ² (Divide line 2.C by 9)			17.4	yd²

INVENTORY - Page 2 of 2

3 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Determine the surface area of the secondary containment system pad to calculate costs for decontaminating and demolishing the pad. Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure.

3.A	Length	ft		
3.B	Width	ft		
3.C	Surface Area of Secondary Containment Sline 3.A by line 3.B)	62.9	ft²	
3.D	Surface Area of Secondary Containment (Divide line 3.C by 9)	7.0	yd²	

4 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Calculate the volume of the secondary containment system pad to determine the cost of removing the pad. Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure.

4.A	Thickness	ft	
4.B	Thickness in yards (Divide line 4.A by 3)	yd	
4.C	Volume of Secondary Containment System Pad in yd ³ (Multiply line 3.D by line 4.B)		yd³

5 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM BERM

Calculate the interior surface area of the secondary containment system berm, or curbing, to determine the cost of decontaminating and demolishing the berm. Demolition of the secondary containment system berm is an additional activity that might be conducted if the owner or operator intends to demolish the berm at the time of closure.

5.A	Length	ft	
5.B	Height	ft	
5.C	Surface Area of Secondary Containment line 5.A by line 5.B)	ft²	
5.D	Surface Area of Secondary Containment System Berm in yd ² (Divide line 5.C by 9)		yd²

- For example, if a secondary containment system pad is circular in shape rather than rectangular, the user would be unable to calculate the surface area of that pad using the method prescribed in section 2 of this inventory worksheet. Rather, the surface area of such a pad could be calculated using the equation πr^2 .
- Owners and operators of in-ground and underground storage tanks are not eligible to use standardized permits.

REMOVAL OF WASTE - Page 1 of 1

1	Maximum volume of waste to be removed from the tank and ancillary piping (Enter from worksheet TS-2, line 1.E)	1,002	gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate required to remove waste from tank and ancillary piping ^c		work hr/gal	
5	Number of hours required to remove waste from tank and ancillary piping (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	1	work hrs	
_	L COST OF REMOVAL OF WASTE FROM TANK 6 (Multiply line 3 by line 5) (Enter total on Works	\$107		

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to remove waste from the unit.
- Enter the estimated number of hours required to remove one gallon of waste from the tank system. If, for example, it will take 1 minute to remove each gallon of waste from the system, enter a work rate of 0.017 (1 divided by 60) for removing the waste. If an estimate of the total number of hours required to remove waste from the tank and ancillary piping has already been formulated, you may bypass this step and enter that number directly on line 5.

FLUSHING THE TANK AND PIPING - Page 1 of 2

1	Maximum capacity of the tank and ancillary piping (Enter from Worksheet TS-2, line 1.E)	1,002	gal	
2	Number of times tank and ancillary piping will be flushed (if unknown, assume 1)	1		
3	Total volume of flushing solution (Multiply line 1 by line 2)	1,002	gal	
4	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
5	Labor and equipment cost per work hour ^b	\$		
6	Work rate required to flush tank and ancillary piping ^c		work hr/gal	
7	Number of hours required to flush tank and ancillary piping (Multiply line 3 by line 6) (One hour minimum; round up to the halfhour)	1	work hrs	
8	Subtotal of labor and equipment costs to flush piping (Multiply line 5 by line 7)	\$107		
9	Total volume of flushing solution (Enter from line 3). (The flushing solution generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B (for water-based flushing solution) or TS-12 and TS-13A (for a solvent solution) to calculate the transportation, treatment, and disposal cost. If the flushing solution is to be placed in drums, complete lines 10 through 12.)	1,002	gal	
10	Number of drums required to contain flushing solution (Divide line 9 by 55 gallons per drum; round up to the nearest whole number)		drums	
11	Cost of one drum	\$	/drum	
12	Cost of drums needed to contain flushing solution (Multiply line 10 by line 11)			\$0
	L COST OF FLUSHING OF TANK AND ANCILLAR 2) (Enter total on Worksheet TS-1, line 3)	RY PIPING	(Add lines 8	\$107

Remember to calculate costs for transporting, treating, and disposing of the wastes in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If the wastes are to be managed as a bulk liquid, use worksheet TS-13B.

FLUSHING THE TANK AND PIPING - Page 2 of 2

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to flush the tank system.
- Enter the estimated number of hours required to flush the tank system for every one gallon of flushing solution. If, for example, it will take 1 minute for every gallon of flushing solution to flush the tank system, enter a work rate of 0.017 (1 divided by 60) for flushing the tank and piping. If an estimate of the total number of hours required to flush the tank and piping has already been formulated, you may bypass this step and enter that number directly on line 7.

DECONTAMINATION SUMMARY SHEET - Page 1 of 1

Facility Name: 1,000 Gallons - Left In Place

D	DECONTAMINATION SUMMARY WORKSHEET				
	Activity	Worksheet Number	Cost (\$)		
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	TS-10A	378		
2.	Decontamination of Unit by Sandblasting	TS-10B			
3.	Decontamination of Heavy Equipment	TS-10C			
TOT (Ente	\$378				

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	156.5	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	4.5	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply I	\$303		
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²) ^d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	626	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$303		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	62.9	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	2.0	work hrs	
6	Subtotal of labor and equipment cost to decontaminate the unit by steam cleaning or pressure washing (Multiply line 3 by line 5)			\$75
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²) ^d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	252	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$75		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: 1,000 Gallons - Left in Place

SAMPLING AND ANALYSIS SUMMARY WORKSHEET				
	Activity	Worksheet Number	Cost (\$)	
1.	Drilling and Subsurface Soil Sampling & Analysis	TS-11B		
2.	Concrete Core Sampling & Analysis	TS-11C		
3.	Wipe Sampling & Analysis	TS-11D	508	
4.	Surface Water/Liquid Sampling & Analysis	TS-11E	2,033	
5.	Soil/Sludge/Sediment Sampling & Analysis	TS-11F		
TOT	\$2,541			

SAMPLE INVENTORY - Page 1 of 2

The information entered on this inventory worksheet will be used in completing the appropriate worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBEI	1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES				
In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.					
1	Number of Subsurface	e Soil Samples			
	Boring Diameter:				
		boreholes	samples/borehole	total samples	
2 NUMBEI	R OF CONCRETE CORE	SAMPLES			
		mber of concrete core sa s to be collected in the b	amples to be collected foox provided.	r each individual unit.	
2	Number of Concrete C	Core Samples		total samples	
3 NUMBEI	R OF WIPE SAMPLES				
			s and the number of wip Imber of samples to be c		
3	Number of Wipe Samp	ples			
	locations samples/location 1 total samples				
4 NUMBEI	R OF SURFACE WATER	/LIQUID SAMPLES			
In the space below, identify the number of grab samples taken on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.					
4	Number of Aqueous S	amples			
		locations	samples/location	4 total samples	

SAMPLE INVENTORY - Page 2 of 2

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES					
In the space below, identify the number of grab samples taken of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.					
5	5 Number of Nonaqueous Samples				
		locations	samples/location	total samples	

WIPE SAMPLING & ANALYSIS - Page 1 of 1

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1	1 COLLECTING WIPE SAMPLES					
	1.A	Number of wipe samples to be collected (Enter from worksheet TS-11A, line 3)	1	samples		
	1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE		
	1.C	Labor and equipment cost per work hourb	\$			
	1.D	Work rate required to collect one sample ^c		work hr/sample		
	1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0	work hrs		
	1.F	F Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)			\$91	
2	ANAL	YZING WIPE SAMPLES				
	2.A	Cost of analysis per sampling event for wipe samples (Enter from Page 2 of 2 of this worksheet)	\$139	/event		
	2.B	Number of sampling events	3	events		
	2.C	Cost to Analyze Wipe Samples (Multiply line 2	\$417			
	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet TS-11, line 3)				\$508	

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.
- Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SURFACE WATER/LIQUID SAMPLING & ANALYSIS - Page 1 of 1

Surface water/liquid samples are grab samples taken from lakes, rivers, or ponds, and samples taken of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLL	1 COLLECTING SURFACE WATER/LIQUID SAMPLES					
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet TS-11A, line 4)	4	samples			
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a		level of PPE			
1.C	Labor and equipment cost per work hourb					
1.D	Work rate required to collect one sample ^c	W	ork hr/sample			
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	4.0	work hrs			
1.F	1.F Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)		ne 1.C by	\$365		
2 ANAI	YZING SURFACE WATER/LIQUID SAMPLES					
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	\$139	/event			
2.B	Number of sampling events	12	events			
2.C	2.C Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)			\$1,668		
WAT	AL COST OF COLLECTION AND ANALYSIS OF SER/LIQUID SAMPLES (Add lines 1.F to line 2.C) sheet TS-11, line 4)	\$2,033				

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect surface water/liquid samples.
- Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

TRANSPORTATION OF WASTE - Page 1 of 1

Depending on the activities being conducted, it may not be necessary to complete all sections of the transportation worksheet.

1 TRAN	1 TRANSPORTATION OF WASTE IN DRUMS					
1.A	Number of drums of waste		drums			
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	\$	/truckload			
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)		truckloads			
1.D	Cost to Transport Waste In Drums (Multiply lin	e 1.B by	line 1.C)	\$		
2 TRAN	ISPORTATION OF BULK LIQUIDS					
2.A	Gallons of liquid waste	1,002	gal			
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	\$	/truckload			
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	1	truckloads			
2.D	Cost to Transport Bulk Liquid Waste (Multiply	line 2.B by	y line 2.C)	\$1,088		
3 TRAN	ISPORTATION OF BULK WASTE					
3.A	Number of waste debris boxes		debris boxes			
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	\$	/truckload			
3.C	Cost to Transport Bulk Solid Waste (assume of hauled on each truck) (Multiply line 3.A by line	\$				
	AL COST TO TRANSPORT WASTE (Add lines 1. on Worksheet TS-1, line 10)	D, 2.D, ar	nd 3.C) (Enter	\$1,088		

TREATMENT AND DISPOSAL SUMMARY SHEET - Page 1 of 1

Facility Name: 1,000 Gallons - Left in Place

SUMMARY WORKSHEET					
	Activity	Worksheet Number	Cost (\$)		
1.	Treatment and Disposal of Waste	TS-13A			
2.	Transportation and Disposal of Decontamination Fluids	TS-13B	2,382		
TOTAL (Enter	\$2,382				

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 1 of 2

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. gal gal gal gal gal gal	1,880 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D level of PPE	
3	Labor and equipment cost per work hour ^b	\$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon) ^c	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	1 work hours	
6	Subtotal of labor and equipment cost to pum to a holding tank (multiply line 3 by line 5)	p decontamination fluid	\$43
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	\$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	1 tanks	
10	Subtotal of tank rental costs (Multiply lines 7	, 8, and 9)	\$365
11	Removal cost per gallon of bulk liquid ^d	\$ /gal	
12	Subtotal of removal cost for bulk liquids (Mul	tiply line 1 by line 11)	\$1,974
	TOTAL COST TO TRANSPORT AND DISPO DECONTAMINATION FLUID AS A BULK LIG and 12) (Enter total on Worksheet TS-13, I	QUID (Add lines 6, 10,	\$2,382

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.
- Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already bee formulated, you may bypass this step and enter that number directly on line 5.
- d Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure	1	
2	Cost of certification of closure per unit ^b	\$	
	TOTAL COST OF CERTIFICATION OF CLC by line 2) (Enter total on Worksheet TS-1,		\$3,640

- Facilities closing multiple tanks in the same manner at the same time should incur cost of certification of closure only once.
- This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK LEFT IN PLACE AT CLOSURE - CAPACITY 1,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 1,000 Gallons - Left in Place -Ignitable Waste

SUMMARY WORKSHEET					
	Activity				
of closure might inte effect clo	the activities listed below are conducted routinely as part e of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of tional activities are listed in italic type.	Worksheet Number	Cost (\$)		
1.	Removal of Waste	TS-3	107		
2.	Tank System Purging (ignitible wastes only)	TS-4	47		
3.	Flushing the Tank and Piping	TS-5	107		
4.	Disassembly and Loading	TS-6			
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	378		
9.	Sampling and Analysis	TS-11	2,541		
10.	Transportation	TS-12	1,088		
11.	Treatment and Disposal	TS-13	2,382		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		6,650		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	665		
14.	Certification of Closure	TS-14	3,640		
15.	15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)				
16.					
TOTA	AL COST OF CLOSURE (add lines 15 and 16)		\$13,146		

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	1,002	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	1.5	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply lir	ne 2 by line 3)	\$15
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	1.0	work hrs	
9	Labor cost to purge tank system (Multiply line	6 by line	8)	\$32
	AL COST OF TANK SYSTEM PURGING (Add line orksheet TS-1, line 2)	\$47		

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMATIN	NG WORKSHEETS FO	OR CLOSURE OF A	TANK SYSTEM
TAINK REIVI	OVED AT CLOSURE	- CAPACITY 1,000	GALLONS

Facility Name: 1,000 Gallons - Removed at Closure

	SUMMARY WORKSHEET					
	Activity					
of closure might inte effect clo	the activities listed below are conducted routinely as part of tank systems. The owner or operator, however, and or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of tional activities are listed in italic type.	Worksheet Number	Cost (\$)			
1.	Removal of Waste	TS-3	107			
2.	Tank System Purging (ignitible wastes only)	TS-4				
3.	Flushing the Tank and Piping	TS-5	107			
4.	Disassembly and Loading	TS-6	156			
5.	Demolition and Removal of Containment System	TS-7				
6.	Removal of Soil	TS-8				
7.	Backfill	TS-9				
8.	Decontamination	TS-10	378			
9.	Sampling and Analysis	TS-11	2,541			
10.	Transportation	TS-12	1,088			
11.	Treatment and Disposal	TS-13	2,382			
12.	Subtotal of Closure Costs (Add lines 1 through 11)		6,759			
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	676			
14.	Certification of Closure	TS-14	3,640			
15.	15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)					
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			2,215			
ТОТ	AL COST OF CLOSURE (add lines 15 and 16)		\$13,290			

DISASSEMBLY AND LOADING - Page 1 of 2

This worksheet can be used to determine the costs of disassembling and loading above ground or onground tanks and ancillary piping. $^{\rm a}$

1 DISA	SSEMBLY OF ANCILLARY PIPING			
1.A	Length of ancillary piping to be disassembled (Enter from worksheet TS-2, line 1.C)	14.2	ft	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	level of PPE	
1.C	Labor and equipment cost per work hour ^c	\$		
1.D	Work rate required to disassemble one ft of pipe ^d		work hr/ft	
1.E	Number of hours required to disassemble ancillary piping (Multiply line 1.A by line 1.D) (One hour minimum; round up to the halfhour)	2.5	work hrs	
1.F	Cost to Disassemble Ancillary Piping (Multiply	line 1.C b	y line 1.E)	\$111
2 LOAI 2.A	Capacity of tank (Enter from worksheet	1,000	anl	
		1,000 D	gal level of PPE	
2.A	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity		g	
2.A 2.B	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	g	
2.A 2.B 2.C	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon	D	level of PPE work hr/	
2.A 2.B 2.C 2.D	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon capacity ^f Number of hours required to load tank (Multiply line 2.A by line 2.D) (One hour	D \$	level of PPE work hr/ gal capacity	\$45

DISASSEMBLY AND LOADING - Page 2 of 2

- Owners and operators of in-ground and underground tank systems are not eligible to use standard permits.
- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to disassemble ancillary piping.
- d Enter the estimated number of work hours required to disassemble one foot of ancillary piping. If, for example, it will take 10 minutes to disassemble each foot of ancillary piping, enter a work rate of 0.167 (10 divided by 60) for disassembling the piping. If an estimate of the total number of hours required to disassemble the piping has already been formulated, you may bypass this step and enter that number directly on line 1.E.
- Enter the estimated cost per work hour of all labor and equipment needed to load components of the onground or aboveground tank system. In addition to costs for labor, this cost should include the average cost per work hour of rental of all equipment and purchase of all supplies needed to conduct this activity.
- Enter the estimated number of work hours per gallon of capacity required to load the components of the on-ground or aboveground tank system. If, for example, it will take 1 minute for every gallon of capacity to load components of the tank system, enter a work rate of 0.017 (1 divided by 60) for loading the system. If an estimate of the total number of hours required to load the tank system has already been formulated, you may bypass this step and enter that number directly on line 2.E.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK REMOVED AT CLOSURE - CAPACITY 1,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 1,000 Gallons - Removed at Closure -Ignitable Waste

	SUMMARY WORKSHEET					
of closure might inte effect clo	Activity the activities listed below are conducted routinely as part of tank systems. The owner or operator, however, and or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of tional activities are listed in italic type.	Worksheet Number	Cost (\$)			
1.	Removal of Waste	TS-3	107			
2.	Tank System Purging (ignitible wastes only)	TS-4	47			
3.	Flushing the Tank and Piping	TS-5	107			
4.	Disassembly and Loading	TS-6	156			
5.	Demolition and Removal of Containment System	TS-7				
6.	Removal of Soil	TS-8				
7.	Backfill	TS-9				
8.	Decontamination	TS-10	378			
9.	Sampling and Analysis	TS-11	2,541			
10.	Transportation	TS-12	1,088			
11.	Treatment and Disposal	TS-13	2,382			
12.	Subtotal of Closure Costs (Add lines 1 through 11)		6,806			
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	681			
14.	Certification of Closure	TS-14	3,640			
15.	Subtotal (Add engineering expenses and cost of certification closure costs) (Add lines 12, 13, and 14)	on of closure to	11,127			
16.	Contingency Allowance (approximately 20% of closure coexpenses, and cost of certification of closure) (Multiply lin		2,225			
TOT	AL COST OF CLOSURE (add lines 15 and 16)		\$13,352			

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	1,002	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	15.0	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply lir	ne 2 by line 3)	\$15
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	1.0	work hrs	
9	Labor cost to purge tank system (Multiply line 6 by line 8)			\$32
	AL COST OF TANK SYSTEM PURGING (Add line orksheet TS-1, line 2)	\$47		

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMATING TANK LEFT IN	G WORKSHEETS FOR PLACE AT CLOSURE	CLOSURE OF A TANK - CAPACITY 5,000 GALI	SYSTEM LONS

Facility Name: 5,000 Gallons - Left in Place

SUMMARY WORKSHEET				
of closure might into effect clo	Activity Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number			
1.	Removal of Waste	TS-3	107	
2.	Tank System Purging (ignitible wastes only)	TS-4		
3.	Flushing the Tank and Piping	TS-5	215	
4.	Disassembly and Loading	TS-6		
5.	Demolition and Removal of Containment System	TS-7		
6.	Removal of Soil	TS-8		
7.	Backfill	TS-9		
8.	Decontamination	TS-10	1,160	
9.	Sampling and Analysis	TS-11	2,541	
10.	Transportation	TS-12	1,088	
11.	Treatment and Disposal	TS-13	8,929	
12.	Subtotal of Closure Costs (Add lines 1 through 11)		14,040	
13. Engineering Expenses (approximately 10% of closure costs, excluding certification of closure [Multiply line 12 by 0.10])			1,404	
14.	Certification of Closure	3,640		
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			19,084	
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			3,817	
TOTA	\$22,901			

INVENTORY - Page 1 of 2

The information entered in this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the cost of closure for tank systems. If the design characteristics of the tank system to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures, soils, and materials to be removed. Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete all sections of this inventory worksheet.

1 UNIT DE	1 UNIT DESCRIPTION AND MAXIMUM PERMITTED CAPACITY					
Describe	Describe the unit to determine the cost of the activities to be conducted to close it.					
1.A	Type of tank system (aboveground or on-ground) ^b					
1.B	Maximum permitted capacity of tank	5,000	gal			
1.C	Total length of ancillary piping	71.0	ft			
1.D	Maximum capacity of ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the capacity of ancillary piping)	12	gal			
1.E	Maximum capacity of tank and ancillary piping (Add lines 1.B and 1.C)	5,012	gal			
1.F	Vault			t system (external t	o tank)	
2 INTERIC	OR SURFACE AREA OF TANK SYSTEM					
Determi	ne the interior surface area of the tank sys	tem to determ	ine costs of	decontamination.		
2.A	Interior surface area of tank (Refer to Page 4 of 5 of this worksheet for guidance on estimating the interior surface area of a tank.)	414.0	ft²			
2.B	Ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the interior surface area of ancillary piping.)	38.3	ft²			
2.C	2.C Surface Area of Tank System (Add lines 2.A and 2.B)			462.3	ft²	
2.D	2.D Surface Area of Tank System in yd² (Divide line 2.C by 9)			51.4	yd²	

INVENTORY - Page 2 of 2

3 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Determine the surface area of the secondary containment system pad to calculate costs for decontaminating and demolishing the pad. Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure.

3.A	Length	ft		
3.B	Width	ft		
3.C Surface Area of Secondary Containment System Pad (Multiply line 3.A by line 3.B)			314.3	ft²
3.D	3.D Surface Area of Secondary Containment System Pad in yd ² (Divide line 3.C by 9)			yd²

4 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Calculate the volume of the secondary containment system pad to determine the cost of removing the pad. Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure.

4.A	Thickness	ft	
4.B	Thickness in yards (Divide line 4.A by 3)	yd	
4.C	Volume of Secondary Containment System Pad in yd ³ (Multiply line 3.D by line 4.B)		yd³

5 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM BERM

Calculate the interior surface area of the secondary containment system berm, or curbing, to determine the cost of decontaminating and demolishing the berm. Demolition of the secondary containment system berm is an additional activity that might be conducted if the owner or operator intends to demolish the berm at the time of closure.

5.A	Length	ft	
5.B	Height	ft	
5.C	Surface Area of Secondary Containment line 5.A by line 5.B)	ft²	
5.D	Surface Area of Secondary Containment System Berm in yd ² (Divide line 5.C by 9)		yd²

- For example, if a secondary containment system pad is circular in shape rather than rectangular, the user would be unable to calculate the surface area of that pad using the method prescribed in section 2 of this inventory worksheet. Rather, the surface area of such a pad could be calculated using the equation πr^2 .
- Owners and operators of in-ground and underground storage tanks are not eligible to use standardized permits.

REMOVAL OF WASTE - Page 1 of 1

1	Maximum volume of waste to be removed from the tank and ancillary piping (Enter from worksheet TS-2, line 1.E)	5,012	gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate required to remove waste from tank and ancillary piping ^c		work hr/gal	
5	Number of hours required to remove waste from tank and ancillary piping (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	1	work hrs	
	TOTAL COST OF REMOVAL OF WASTE FROM TANK AND ANCILLARY PIPING (Multiply line 3 by line 5) (Enter total on Worksheet TS-1, line 1)			\$107

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to remove waste from the unit.
- Enter the estimated number of hours required to remove one gallon of waste from the tank system. If, for example, it will take 1 minute to remove each gallon of waste from the system, enter a work rate of 0.017 (1 divided by 60) for removing the waste. If an estimate of the total number of hours required to remove waste from the tank and ancillary piping has already been formulated, you may bypass this step and enter that number directly on line 5.

FLUSHING THE TANK AND PIPING - Page 1 of 2

1	Maximum capacity of the tank and ancillary piping (Enter from Worksheet TS-2, line 1.E)	5,012	gal	
2	Number of times tank and ancillary piping will be flushed (if unknown, assume 1)	1		
3	Total volume of flushing solution (Multiply line 1 by line 2)	5,012	gal	
4	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
5	Labor and equipment cost per work hour ^b	\$		
6	Work rate required to flush tank and ancillary piping ^c		work hr/gal	
7	Number of hours required to flush tank and ancillary piping (Multiply line 3 by line 6) (One hour minimum; round up to the halfhour)	2	work hrs	
8	Subtotal of labor and equipment costs to flush piping (Multiply line 5 by line 7)			\$215
9	Total volume of flushing solution (Enter from line 3). (The flushing solution generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B (for water-based flushing solution) or TS-12 and TS-13A (for a solvent solution) to calculate the transportation, treatment, and disposal cost. If the flushing solution is to be placed in drums, complete lines 10 through 12.)	5,012	gal	
10	Number of drums required to contain flushing solution (Divide line 9 by 55 gallons per drum; round up to the nearest whole number)		drums	
11	Cost of one drum	\$	/drum	
12	Cost of drums needed to contain flushing solution (Multiply line 10 by line 11)			\$0
	L COST OF FLUSHING OF TANK AND ANCILLAR 2) (Enter total on Worksheet TS-1, line 3)	RY PIPING	(Add lines 8	\$215

Remember to calculate costs for transporting, treating, and disposing of the wastes in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If the wastes are to be managed as a bulk liquid, use worksheet TS-13B.

FLUSHING THE TANK AND PIPING - Page 2 of 2

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to flush the tank system.
- Enter the estimated number of hours required to flush the tank system for every one gallon of flushing solution. If, for example, it will take 1 minute for every gallon of flushing solution to flush the tank system, enter a work rate of 0.017 (1 divided by 60) for flushing the tank and piping. If an estimate of the total number of hours required to flush the tank and piping has already been formulated, you may bypass this step and enter that number directly on line 7.

DECONTAMINATION SUMMARY SHEET - Page 1 of 1

Facility Name: 5,000 Gallons - Left In Place

D	DECONTAMINATION SUMMARY WORKSHEET				
	Activity	Worksheet Number	Cost (\$)		
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	TS-10A	1,160		
2.	Decontamination of Unit by Sandblasting	TS-10B			
3.	Decontamination of Heavy Equipment	TS-10C			
TOTAL COST OF DECONTAMINATION (Add lines 1, 2, and 3) (Enter total on Worksheet TS-1, line 8)			\$1,160		

TANK SYSTEMS

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	461.4	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	12.5	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply I			\$843
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²)d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	1,846	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$843		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	314.3	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	8.5	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply I			\$317
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²)d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	1,257	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$317		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: 5,000 Gallons - Left in Place

SAMPLING AND ANALYSIS SUMMARY WORKSHEET				
	Activity	Worksheet Number	Cost (\$)	
1.	Drilling and Subsurface Soil Sampling & Analysis	TS-11B		
2.	Concrete Core Sampling & Analysis	TS-11C		
3.	Wipe Sampling & Analysis	TS-11D	508	
4.	Surface Water/Liquid Sampling & Analysis	TS-11E	2,033	
5.	Soil/Sludge/Sediment Sampling & Analysis	TS-11F		
	TOTAL SAMPLING AND ANALYSIS COST (Add lines 1 through 5) (Enter total on Worksheet TS-1, line 9) \$2,5			

SAMPLE INVENTORY - Page 1 of 2

The information entered on this inventory worksheet will be used in completing the appropriate worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES						
In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.						
1	Number of Subsurface Soil Samples					
	Boring Diameter:					
		boreholes samples/borehole total samples				
2 NUMBEI	2 NUMBER OF CONCRETE CORE SAMPLES					
		mber of concrete core sa s to be collected in the b	amples to be collected foox provided.	r each individual unit.		
2	Number of Concrete C	Core Samples		total samples		
3 NUMBEI	R OF WIPE SAMPLES					
			s and the number of wip Imber of samples to be c			
3	Number of Wipe Samp	ples				
		locations	samples/location	1 total samples		
4 NUMBEI	R OF SURFACE WATER	/LIQUID SAMPLES				
In the space below, identify the number of grab samples taken on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.						
4	Number of Aqueous Samples					
		locations	samples/location	4 total samples		

SAMPLE INVENTORY - Page 2 of 2

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES					
In the space below, identify the number of grab samples taken of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.					
5	5 Number of Nonaqueous Samples				
locations samples/location total samples					

WIPE SAMPLING & ANALYSIS - Page 1 of 1

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1 C	OLL	ECTING WIPE SAMPLES			
1.	.A	Number of wipe samples to be collected (Enter from worksheet TS-11A, line 3)	1	samples	
1.	.В	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
1.	.C	Labor and equipment cost per work hourb	\$		
1.	.D	Work rate required to collect one sample ^c		work hr/sample	
1.	.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0	work hrs	
1.	.F	Cost to Collect Wipe Samples (Multiply line 1.	C by lin	e 1.E)	\$91
2 AI	NAL	YZING WIPE SAMPLES			
2.	2.A Cost of analysis per sampling event for wipe samples (Enter from Page 2 of 2 of this worksheet) \$139 /event				
2.	.B	Number of sampling events	3	events	
2.	2.C Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)			\$417	
	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet TS-11, line 3)			\$508	

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.
- Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SURFACE WATER/LIQUID SAMPLING & ANALYSIS - Page 1 of 1

Surface water/liquid samples are grab samples taken from lakes, rivers, or ponds, and samples taken of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLL	1 COLLECTING SURFACE WATER/LIQUID SAMPLES			
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet TS-11A, line 4)	4	samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a		level of PPE	
1.C	Labor and equipment cost per work hourb			
1.D	Work rate required to collect one sample ^c	W	ork hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	4.0	work hrs	
1.F	Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)			\$365
2 ANAI	YZING SURFACE WATER/LIQUID SAMPLES			
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	\$139	/event	
2.B	Number of sampling events	12	events	
2.C	2.C Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)			\$1,668
WAT	TOTAL COST OF COLLECTION AND ANALYSIS OF SURFACE WATER/LIQUID SAMPLES (Add lines 1.F to line 2.C) (Enter total on Worksheet TS-11, line 4)			\$2,033

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect surface water/liquid samples.
- Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

TRANSPORTATION OF WASTE - Page 1 of 1

Depending on the activities being conducted, it may not be necessary to complete all sections of the transportation worksheet.

1 TRAN	ISPORTATION OF WASTE IN DRUMS			
1.A	Number of drums of waste		drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)		truckloads	
1.D	Cost to Transport Waste In Drums (Multiply lin	e 1.B by I	line 1.C)	\$
2 TRAN	ISPORTATION OF BULK LIQUIDS			
2.A	Gallons of liquid waste	5,012	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	1	truckloads	
2.D	Cost to Transport Bulk Liquid Waste (Multiply	line 2.B by	y line 2.C)	\$1,088
3 TRAN	ISPORTATION OF BULK WASTE			
3.A	Number of waste debris boxes		debris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
3.C	3.C Cost to Transport Bulk Solid Waste (assume one debris box can be hauled on each truck) (Multiply line 3.A by line 3.B)			\$
	AL COST TO TRANSPORT WASTE (Add lines 1. on Worksheet TS-1, line 10)	\$1,088		

TREATMENT AND DISPOSAL SUMMARY SHEET - Page 1 of 1

Facility Name: 5,000 Gallons - Left in Place

	SUMMARY WORKSHEET			
	Activity	Worksheet Number	Cost (\$)	
1.	Treatment and Disposal of Waste	TS-13A		
2.	Transportation and Disposal of Decontamination Fluids	TS-13B	8,929	
TOTAL COST OF TREATMENT AND DISPOSAL (Add lines 1 and 2) (Enter total on Worksheet TS-1, line 11)			\$8,929	

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 1 of 2

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. gal gal gal gal gal	8,115 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D level of PPE	
3	Labor and equipment cost per work hour ^b	\$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon) ^c	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	1 work hours	
6	Subtotal of labor and equipment cost to pum to a holding tank (multiply line 3 by line 5)	p decontamination fluid	\$43
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	\$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	1 tanks	
10	Subtotal of tank rental costs (Multiply lines 7	, 8, and 9)	\$365
11	Removal cost per gallon of bulk liquid ^d	\$ /gal	
12	Subtotal of removal cost for bulk liquids (Mul	tiply line 1 by line 11)	\$8,521
	\$8,929		

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.
- Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already bee formulated, you may bypass this step and enter that number directly on line 5.
- d Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure	1	
2	Cost of certification of closure per unit ^b	\$	
	\$3,640		

- Facilities closing multiple tanks in the same manner at the same time should incur cost of certification of closure only once.
- This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK LEFT IN PLACE AT CLOSURE - CAPACITY 5,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 5,000 Gallons - Left in Place -Ignitable Waste

	SUMMARY WORKSHEET				
of closure might into effect clo	Activity Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number				
1.	Removal of Waste	TS-3	107		
2.	Tank System Purging (ignitible wastes only)	TS-4	123		
3.	Flushing the Tank and Piping	TS-5	215		
4.	Disassembly and Loading	TS-6			
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	1,160		
9.	Sampling and Analysis	TS-11	2,541		
10.	Transportation	TS-12	1,088		
11.	Treatment and Disposal	TS-13	8,929		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		14,163		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	1,416		
14.	Certification of Closure	TS-14	3,640		
15.	15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)				
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			3,844		
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$23,063		

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	5,012	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	75.2	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply lir	ne 2 by line 3)	\$75
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	1.5	work hrs	
9	Labor cost to purge tank system (Multiply line	6 by line	8)	\$48
	AL COST OF TANK SYSTEM PURGING (Add line orksheet TS-1, line 2)	\$123		

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMATING WORKSHEETS I TANK REMOVED AT CLOSUR	FOR CLOSURE OF A TANK SYSTEM E - CAPACITY 5,000 GALLONS

Facility Name: 5,000 Gallons - Removed at Closure

	SUMMARY WORKSHEET				
of closure might into effect clo	Activity Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number				
1.	Removal of Waste	TS-3	107		
2.	Tank System Purging (ignitible wastes only)	TS-4			
3.	Flushing the Tank and Piping	TS-5	215		
4.	Disassembly and Loading	TS-6	714		
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	1,160		
9.	Sampling and Analysis	TS-11	2,541		
10.	Transportation	TS-12	1,088		
11.	Treatment and Disposal	TS-13	8,929		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		14,754		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	1,475		
14.	Certification of Closure	TS-14	3,640		
15.	15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)				
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			3,974		
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$23,843		

DISASSEMBLY AND LOADING - Page 1 of 2

This worksheet can be used to determine the costs of disassembling and loading above ground or onground tanks and ancillary piping. $^{\rm a}$

1 DISA	SSEMBLY OF ANCILLARY PIPING			
1.A	Length of ancillary piping to be disassembled (Enter from worksheet TS-2, line 1.C)	71.0	ft	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	level of PPE	
1.C	Labor and equipment cost per work hour ^c	\$		
1.D	Work rate required to disassemble one ft of pipe ^d		work hr/ft	
1.E	Number of hours required to disassemble ancillary piping (Multiply line 1.A by line 1.D) (One hour minimum; round up to the halfhour)	11.0	work hrs	
1.F	Cost to Disassemble Ancillary Piping (Multiply	line 1.C b	y line 1.E)	\$489
2 LOAI	DING			
2.A	Capacity of tank (Enter from worksheet TS-2, line 1.B)			
	13-2, IIIIe 1.b)	5,000	gal	
2.B	Level of PPE assumed for this activity (protection level D, C, or B) ^b	5,000 D	gal level of PPE	
2.B 2.C	Level of PPE assumed for this activity		-	
	Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	-	
2.C	Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon	D	level of PPE work hr/	
2.C 2.D	Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon capacity ^f Number of hours required to load tank (Multiply line 2.A by line 2.D) (One hour	D \$	level of PPE work hr/ gal capacity	\$225

DISASSEMBLY AND LOADING - Page 2 of 2

- Owners and operators of in-ground and underground tank systems are not eligible to use standard permits.
- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to disassemble ancillary piping.
- d Enter the estimated number of work hours required to disassemble one foot of ancillary piping. If, for example, it will take 10 minutes to disassemble each foot of ancillary piping, enter a work rate of 0.167 (10 divided by 60) for disassembling the piping. If an estimate of the total number of hours required to disassemble the piping has already been formulated, you may bypass this step and enter that number directly on line 1.E.
- Enter the estimated cost per work hour of all labor and equipment needed to load components of the onground or aboveground tank system. In addition to costs for labor, this cost should include the average cost per work hour of rental of all equipment and purchase of all supplies needed to conduct this activity.
- Enter the estimated number of work hours per gallon of capacity required to load the components of the on-ground or aboveground tank system. If, for example, it will take 1 minute for every gallon of capacity to load components of the tank system, enter a work rate of 0.017 (1 divided by 60) for loading the system. If an estimate of the total number of hours required to load the tank system has already been formulated, you may bypass this step and enter that number directly on line 2.E.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK REMOVED AT CLOSURE - CAPACITY 5,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: <u>5,000 Gallons - Removed at Closure -Ignitable Waste</u>

	SUMMARY WORKSHEET				
	Activity				
of closure might into effect clo	Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number				
1.	Removal of Waste	TS-3	107		
2.	Tank System Purging (ignitible wastes only)	TS-4	123		
3.	Flushing the Tank and Piping	TS-5	215		
4.	Disassembly and Loading	TS-6	714		
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	1,160		
9.	Sampling and Analysis	TS-11	2,541		
10.	Transportation	TS-12	1,088		
11.	Treatment and Disposal	TS-13	8,929		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		14,877		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	1,488		
14.	Certification of Closure	TS-14	3,640		
15.	Subtotal (Add engineering expenses and cost of certificati closure costs) (Add lines 12, 13, and 14)	ion of closure to	20,005		
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			4,001		
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$24,006		

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	5,012	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	75.2	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply lir	ne 2 by line 3)	\$75
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	1.5	work hrs	
9	Labor cost to purge tank system (Multiply line	6 by line	8)	\$48
	AL COST OF TANK SYSTEM PURGING (Add line orksheet TS-1, line 2)	\$123		

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMAT TANK LEFT	FING WORKSHEETS F IN PLACE AT CLOSU	FOR CLOSURE OF A RE - CAPACITY 10,0	A TANK SYSTEM 000 GALLONS

Facility Name: 10,000 Gallons - Left in Place

	SUMMARY WORKSHEET			
of closure might into effect clo	Activity Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number			
1.	Removal of Waste	TS-3	215	
2.	Tank System Purging (ignitible wastes only)	TS-4		
3.	Flushing the Tank and Piping	TS-5	376	
4.	Disassembly and Loading	TS-6		
5.	Demolition and Removal of Containment System	TS-7		
6.	Removal of Soil	TS-8		
7.	Backfill	TS-9		
8.	Decontamination	TS-10	2,017	
9.	Sampling and Analysis	TS-11	2,588	
10.	Transportation	TS-12	2,175	
11.	Treatment and Disposal	TS-13	17,117	
12.	Subtotal of Closure Costs (Add lines 1 through 11)		24,488	
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	2,449	
14.	Certification of Closure	TS-14	3,640	
15.	15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			6,115	
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$36,692	

INVENTORY - Page 1 of 2

The information entered in this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the cost of closure for tank systems. If the design characteristics of the tank system to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures, soils, and materials to be removed. Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete all sections of this inventory worksheet.

1 UNIT DESCRIPTION AND MAXIMUM PERMITTED CAPACITY					
Describe	e the unit to determine the cost of the activ	vities to be cor	nducted to o	close it.	
1.A	Type of tank system (aboveground or on-ground) ^b				
1.B	Maximum permitted capacity of tank	10,000	gal		
1.C	Total length of ancillary piping	142.0	ft		
1.D	Maximum capacity of ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the capacity of ancillary piping)	25	gal		
1.E	Maximum capacity of tank and ancillary piping (Add lines 1.B and 1.C)	10,025	gal		
1.F	Type of secondary containment system	Vault Lined (e-wall tank containmen (explain)	t system (external	to tank)
2 INTERIC	OR SURFACE AREA OF TANK SYSTEM				
Determi	ne the interior surface area of the tank sys	tem to determ	ine costs of	decontamination.	
2.A	Interior surface area of tank (Refer to Page 4 of 5 of this worksheet for guidance on estimating the interior surface area of a tank.)	677.0	ft²		
2.B	Ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the interior surface area of ancillary piping.)	76.7	ft²		
2.C	Surface Area of Tank System (Add lines	2.A and 2.B)		753.7	ft²
2.D	2.D Surface Area of Tank System in yd ² (Divide line 2.C by 9)			83.7	yd²

INVENTORY - Page 2 of 2

3 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Determine the surface area of the secondary containment system pad to calculate costs for decontaminating and demolishing the pad. Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure.

3.A	Length	ft		
3.B	Width	ft		
3.C	Surface Area of Secondary Containment (line 3.A by line 3.B)	System Pad (Multiply	628.5	ft²
3.D	Surface Area of Secondary Containment (Divide line 3.C by 9)	System Pad in yd ²	69.8	yd²

4 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Calculate the volume of the secondary containment system pad to determine the cost of removing the pad. Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure.

4.A	Thickness	ft	
4.B	Thickness in yards (Divide line 4.A by 3)	yd	
4.C	Volume of Secondary Containment System Pad in yd ³ (Multiply line 3.D by line 4.B)		yd³

5 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM BERM

Calculate the interior surface area of the secondary containment system berm, or curbing, to determine the cost of decontaminating and demolishing the berm. Demolition of the secondary containment system berm is an additional activity that might be conducted if the owner or operator intends to demolish the berm at the time of closure.

5. A	Length	ft	
5.B	Height	ft	
5.C	Surface Area of Secondary Containment line 5.A by line 5.B)	ft²	
5.D	Surface Area of Secondary Containment System Berm in yd ² (Divide line 5.C by 9)		yd²

- For example, if a secondary containment system pad is circular in shape rather than rectangular, the user would be unable to calculate the surface area of that pad using the method prescribed in section 2 of this inventory worksheet. Rather, the surface area of such a pad could be calculated using the equation πr^2 .
- Owners and operators of in-ground and underground storage tanks are not eligible to use standardized permits.

REMOVAL OF WASTE - Page 1 of 1

1	Maximum volume of waste to be removed from the tank and ancillary piping (Enter from worksheet TS-2, line 1.E)	10,025	gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hour ^b	\$		
4	Work rate required to remove waste from tank and ancillary piping ^c		work hr/gal	
5	Number of hours required to remove waste from tank and ancillary piping (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	2	work hrs	
	TOTAL COST OF REMOVAL OF WASTE FROM TANK AND ANCILLARY PIPING (Multiply line 3 by line 5) (Enter total on Worksheet TS-1, line 1)			\$215

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to remove waste from the unit.
- Enter the estimated number of hours required to remove one gallon of waste from the tank system. If, for example, it will take 1 minute to remove each gallon of waste from the system, enter a work rate of 0.017 (1 divided by 60) for removing the waste. If an estimate of the total number of hours required to remove waste from the tank and ancillary piping has already been formulated, you may bypass this step and enter that number directly on line 5.

FLUSHING THE TANK AND PIPING - Page 1 of 2

1	Maximum capacity of the tank and ancillary piping (Enter from Worksheet TS-2, line 1.E)	10,025	gal	
2	Number of times tank and ancillary piping will be flushed (if unknown, assume 1)	1		
3	Total volume of flushing solution (Multiply line 1 by line 2)	10,025	gal	
4	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
5	Labor and equipment cost per work hour ^b	\$		
6	Work rate required to flush tank and ancillary piping ^c		work hr/gal	
7	Number of hours required to flush tank and ancillary piping (Multiply line 3 by line 6) (One hour minimum; round up to the halfhour)	3.5	work hrs	
8	Subtotal of labor and equipment costs to flush tank and ancillary piping (Multiply line 5 by line 7)			\$376
9	Total volume of flushing solution (Enter from line 3). (The flushing solution generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B (for water-based flushing solution) or TS-12 and TS-13A (for a solvent solution) to calculate the transportation, treatment, and disposal cost. If the flushing solution is to be placed in drums, complete lines 10 through 12.)	10,025	gal	
10	Number of drums required to contain flushing solution (Divide line 9 by 55 gallons per drum; round up to the nearest whole number)		drums	
11	Cost of one drum	\$	/drum	
12	Cost of drums needed to contain flushing solution (Multiply line 10 by line 11)			\$0
TOTAL COST OF FLUSHING OF TANK AND ANCILLARY PIPING (Add lines 8 and 12) (Enter total on Worksheet TS-1, line 3)			\$376	

Remember to calculate costs for transporting, treating, and disposing of the wastes in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If the wastes are to be managed as a bulk liquid, use worksheet TS-13B.

FLUSHING THE TANK AND PIPING - Page 2 of 2

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to flush the tank system.
- Enter the estimated number of hours required to flush the tank system for every one gallon of flushing solution. If, for example, it will take 1 minute for every gallon of flushing solution to flush the tank system, enter a work rate of 0.017 (1 divided by 60) for flushing the tank and piping. If an estimate of the total number of hours required to flush the tank and piping has already been formulated, you may bypass this step and enter that number directly on line 7.

DECONTAMINATION SUMMARY SHEET - Page 1 of 1

Facility Name: 10,000 Gallons - Left In Place

D	DECONTAMINATION SUMMARY WORKSHEET			
	Activity	Worksheet Number	Cost (\$)	
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	TS-10A	2,017	
2.	Decontamination of Unit by Sandblasting	TS-10B		
3.	Decontamination of Heavy Equipment	TS-10C		
TOTAL COST OF DECONTAMINATION (Add lines 1, 2, and 3) (Enter total on Worksheet TS-1, line 8)			\$2,017	

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	751.8	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	20.5	work hrs	
6	Subtotal of labor and equipment cost to decontaminate the unit by steam cleaning or pressure washing (Multiply line 3 by line 5)			\$1,383
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²)d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	3,007	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)		\$	
PRES	TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING (For bulk liquids, enter from line 6. For liquids in drums, add lines 6 and 10.) (Enter total on Worksheet TS-10, line 1)			\$1,383

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	628.5	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	17.0	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply I			\$634
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²) ^d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	2,514	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING (For bulk liquids, enter from line 6. For liquids in drums, add lines 6 and 10.) (Enter total on Worksheet TS-10, line 1)			\$634

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: 5,000 Gallons - Left in Place

SAMPLING AND ANALYSIS SUMMARY WORKSHEET			
	Activity	Worksheet Number	Cost (\$)
1.	Drilling and Subsurface Soil Sampling & Analysis	TS-11B	
2.	Concrete Core Sampling & Analysis	TS-11C	
3.	Wipe Sampling & Analysis	TS-11D	555
4.	Surface Water/Liquid Sampling & Analysis	TS-11E	2,033
5.	Soil/Sludge/Sediment Sampling & Analysis	TS-11F	
TOTA on W	\$2,588		

SAMPLE INVENTORY - Page 1 of 2

The information entered on this inventory worksheet will be used in completing the appropriate worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES						
In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.						
1	Number of Subsurface Soil Samples					
	Boring Diameter:					
		boreholes	samples/borehole	total samples		
2 NUMBEI	R OF CONCRETE CORE	SAMPLES				
		mber of concrete core sa s to be collected in the b	amples to be collected foox provided.	r each individual unit.		
2	Number of Concrete C	Core Samples		total samples		
3 NUMBEI	R OF WIPE SAMPLES					
			s and the number of wip Imber of samples to be c			
3	Number of Wipe Samp	ples				
		locations	samples/location	1 total samples		
4 NUMBEI	R OF SURFACE WATER	/LIQUID SAMPLES				
In the space below, identify the number of grab samples taken on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.						
4	Number of Aqueous Samples					
		locations	samples/location	4 total samples		

SAMPLE INVENTORY - Page 2 of 2

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES						
In the space below, identify the number of grab samples taken of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.						
5	5 Number of Nonaqueous Samples					
locations samples/location total samples						

WIPE SAMPLING & ANALYSIS - Page 1 of 1

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1 C	OLL	ECTING WIPE SAMPLES			
1.	.A	Number of wipe samples to be collected (Enter from worksheet TS-11A, line 3)	1	samples	
1.	.В	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
1.	.C	Labor and equipment cost per work hourb	\$		
1.	.D	Work rate required to collect one sample ^c		work hr/sample	
1.	.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0	work hrs	
1.	1.F Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)			e 1.E)	\$91
2 AI	NAL	YZING WIPE SAMPLES			
2.	2.A Cost of analysis per sampling event for wipe samples (Enter from Page 2 of 2 of this worksheet) \$139 /event				
2.	.B	Number of sampling events	3	events	
2.	2.C Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)			\$417	
	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet TS-11, line 3)			\$508	

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.
- Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SURFACE WATER/LIQUID SAMPLING & ANALYSIS - Page 1 of 1

Surface water/liquid samples are grab samples taken from lakes, rivers, or ponds, and samples taken of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLL	ECTING SURFACE WATER/LIQUID SAMPLES			
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet TS-11A, line 4)	4	samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a		level of PPE	
1.C	Labor and equipment cost per work hourb			
1.D	Work rate required to collect one sample ^c	W	ork hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	4.0	work hrs	
1.F	.F Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)			\$365
2 ANAI	YZING SURFACE WATER/LIQUID SAMPLES			
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	\$139	/event	
2.B	Number of sampling events	12	events	
2.C	2.C Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)			\$1,668
WAT	TOTAL COST OF COLLECTION AND ANALYSIS OF SURFACE WATER/LIQUID SAMPLES (Add lines 1.F to line 2.C) (Enter total on Worksheet TS-11, line 4)			\$2,033

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect surface water/liquid samples.
- Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

TRANSPORTATION OF WASTE - Page 1 of 1

Depending on the activities being conducted, it may not be necessary to complete all sections of the transportation worksheet.

1 TRAN	1 TRANSPORTATION OF WASTE IN DRUMS				
1.A	Number of drums of waste		drums		
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	\$	/truckload		
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)		truckloads		
1.D	Cost to Transport Waste In Drums (Multiply lin	e 1.B by li	ne 1.C)	\$	
2 TRAN	ISPORTATION OF BULK LIQUIDS				
2.A	Gallons of liquid waste	10,024	gal		
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	\$	/truckload		
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	2	truckloads		
2.D	Cost to Transport Bulk Liquid Waste (Multiply	line 2.B by	line 2.C)	\$2,175	
3 TRAN	ISPORTATION OF BULK WASTE				
3.A	Number of waste debris boxes		debris boxes		
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	\$	/truckload		
3.C	3.C Cost to Transport Bulk Solid Waste (assume one debris box can be hauled on each truck) (Multiply line 3.A by line 3.B)			\$	
	TOTAL COST TO TRANSPORT WASTE (Add lines 1.D, 2.D, and 3.C) (Enter total on Worksheet TS-1, line 10)			\$2,175	

TREATMENT AND DISPOSAL SUMMARY SHEET - Page 1 of 1

Facility Name: 10,000 Gallons - Left in Place

	SUMMARY WORKSHEET			
	Activity	Worksheet Number	Cost (\$)	
1.	Treatment and Disposal of Waste	TS-13A		
2.	Transportation and Disposal of Decontamination Fluids	TS-13B	17,117	
TOTAL (Enter tot	\$17,117			

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 1 of 2

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. gal gal gal gal gal	15,546 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D level of PPE	
3	Labor and equipment cost per work hour ^b	\$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon) ^c	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	1 work hours	
6	Subtotal of labor and equipment cost to pum to a holding tank (multiply line 3 by line 5)	p decontamination fluid	\$64
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	\$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	2 tanks	
10	Subtotal of tank rental costs (Multiply lines 7	, 8, and 9)	\$730
11	Removal cost per gallon of bulk liquid ^d	\$ /gal	
12	Subtotal of removal cost for bulk liquids (Mul	tiply line 1 by line 11)	\$16,323
	TOTAL COST TO TRANSPORT AND DISPO DECONTAMINATION FLUID AS A BULK LIG and 12) (Enter total on Worksheet TS-13, I	QUID (Add lines 6, 10,	\$17,117

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.
- Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already bee formulated, you may bypass this step and enter that number directly on line 5.
- d Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure	1	
2	Cost of certification of closure per unit ^b	\$	
	\$3,640		

- Facilities closing multiple tanks in the same manner at the same time should incur cost of certification of closure only once.
- This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK LEFT IN PLACE AT CLOSURE - CAPACITY 10,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 10,000 Gallons - Left in Place -Ignitable Waste

	SUMMARY WORKSHEET				
of closure might into effect clo	Activity Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number				
1.	Removal of Waste	TS-3	215		
2.	Tank System Purging (ignitible wastes only)	TS-4	230		
3.	Flushing the Tank and Piping	TS-5	376		
4.	Disassembly and Loading	TS-6			
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	2,017		
9.	Sampling and Analysis	TS-11	2,588		
10.	Transportation	TS-12	2,175		
11.	Treatment and Disposal	TS-13	17,117		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		24,718		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	2,472		
14.	Certification of Closure	TS-14	3,640		
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			30,830		
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			6,166		
TOTA	TOTAL COST OF CLOSURE (add lines 15 and 16)				

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	10,025	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	150.4	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (l	Multiply line	e 2 by line 3)	\$150
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	2.5	work hrs	
9	9 Labor cost to purge tank system (Multiply line 6 by line 8)			\$80
	TOTAL COST OF TANK SYSTEM PURGING (Add lines 4 and 9) (Enter total on Worksheet TS-1, line 2)			\$230

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMAT	ΓING WORKSHEET	S FOR CLOSURI	E OF A TANK SYS	тем
TANK RE.	MOVED AT CLOSU	RE - CAPACITY	10,000 GALLONS	

Facility Name: 10,000 Gallons - Removed at Closure

	SUMMARY WORKSHEET				
of closure might inte effect clo	Activity Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number				
1.	Removal of Waste	TS-3	215		
2.	Tank System Purging (ignitible wastes only)	TS-4			
3.	Flushing the Tank and Piping	TS-5	376		
4.	Disassembly and Loading	TS-6	1,404		
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	2,017		
9.	Sampling and Analysis	TS-11	2,588		
10.	Transportation	TS-12	2,175		
11.	Treatment and Disposal	TS-13	17,116		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		25,891		
13.					
14.	Certification of Closure	TS-14	3,640		
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			32,120		
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			6,424		
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$38,544		

DISASSEMBLY AND LOADING - Page 1 of 2

This worksheet can be used to determine the costs of disassembling and loading above ground or onground tanks and ancillary piping. $^{\rm a}$

1 DISA	SSEMBLY OF ANCILLARY PIPING			
1.A	Length of ancillary piping to be disassembled (Enter from worksheet TS-2, line 1.C)	142.0	ft	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	level of PPE	
1.C	Labor and equipment cost per work hour ^c	\$		
1.D	Work rate required to disassemble one ft of pipe ^d		work hr/ft	
1.E	Number of hours required to disassemble ancillary piping (Multiply line 1.A by line 1.D) (One hour minimum; round up to the halfhour)	21.5	work hrs	
1.F	Cost to Disassemble Ancillary Piping (Multiply	•		\$955
1.1 Cost to Disassemble Ancillary Fighing (Multiply line 1.0 by line 1.1) \$755				
2 LOAD	DING			
2 LOAE	Capacity of tank (Enter from worksheet TS-2, line 1.B)	10,000	gal	
	Capacity of tank (Enter from worksheet	10,000 D	gal level of PPE	
2.A	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity		<u> </u>	
2.A 2.B	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	<u> </u>	
2.A 2.B 2.C	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon	D	level of PPE work hr/	
2.A 2.B 2.C 2.D	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon capacity ^f Number of hours required to load tank (Multiply line 2.A by line 2.D) (One hour	D \$	level of PPE work hr/ gal capacity	\$449

DISASSEMBLY AND LOADING - Page 2 of 2

- Owners and operators of in-ground and underground tank systems are not eligible to use standard permits.
- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to disassemble ancillary piping.
- d Enter the estimated number of work hours required to disassemble one foot of ancillary piping. If, for example, it will take 10 minutes to disassemble each foot of ancillary piping, enter a work rate of 0.167 (10 divided by 60) for disassembling the piping. If an estimate of the total number of hours required to disassemble the piping has already been formulated, you may bypass this step and enter that number directly on line 1.E.
- Enter the estimated cost per work hour of all labor and equipment needed to load components of the onground or aboveground tank system. In addition to costs for labor, this cost should include the average cost per work hour of rental of all equipment and purchase of all supplies needed to conduct this activity.
- Enter the estimated number of work hours per gallon of capacity required to load the components of the on-ground or aboveground tank system. If, for example, it will take 1 minute for every gallon of capacity to load components of the tank system, enter a work rate of 0.017 (1 divided by 60) for loading the system. If an estimate of the total number of hours required to load the tank system has already been formulated, you may bypass this step and enter that number directly on line 2.E.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK REMOVED AT CLOSURE - CAPACITY 10,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 10,000 Gallons - Removed at Closure -Ignitable Waste

	SUMMARY WORKSHEET			
of closure might inte effect clo	Activity Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number			
1.	Removal of Waste	TS-3	215	
2.	Tank System Purging (ignitible wastes only)	TS-4	230	
3.	Flushing the Tank and Piping	TS-5	376	
4.	Disassembly and Loading	TS-6	1,404	
5.	Demolition and Removal of Containment System	TS-7		
6.	Removal of Soil	TS-8		
7.	Backfill	TS-9		
8.	Decontamination	TS-10	2,017	
9.	Sampling and Analysis	TS-11	2,588	
10.	Transportation	TS-12	2,175	
11.	Treatment and Disposal	TS-13	17,116	
12.	Subtotal of Closure Costs (Add lines 1 through 11)		26,121	
13.				
14.	Certification of Closure	TS-14	3,640	
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			32,373	
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			6,475	
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$38,848	

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	10,025	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	150.4	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (l	Multiply line	e 2 by line 3)	\$150
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	2.5	work hrs	
9	9 Labor cost to purge tank system (Multiply line 6 by line 8)			\$80
	AL COST OF TANK SYSTEM PURGING (Add line orksheet TS-1, line 2)	\$230		

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF TANK LEFT IN PLACE AT CLOSURE - CAPACITY 15,	A TANK SYSTEM ,000 GALLONS

Facility Name: 15,000 Gallons - Left in Place

	SUMMARY WORKSHEET				
of closure might into effect clo	Activity Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number				
1.	Removal of Waste	TS-3	322		
2.	Tank System Purging (ignitible wastes only)	TS-4			
3.	Flushing the Tank and Piping	TS-5	590		
4.	Disassembly and Loading	TS-6			
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	2,772		
9.	Sampling and Analysis	TS-11	3,096		
10.	Transportation	TS-12	3,263		
11.	Treatment and Disposal	TS-13	25,086		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		35,129		
13.					
14.	Certification of Closure	TS-14	3,640		
15.	15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)				
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			8,456		
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$50,738		

INVENTORY - Page 1 of 2

The information entered in this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the cost of closure for tank systems. If the design characteristics of the tank system to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures, soils, and materials to be removed. Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete all sections of this inventory worksheet.

	UNIT DESCRIPTION AND MAXIMUM PERMITTED CAPACITY Describe the unit to determine the cost of the activities to be conducted to close it.					
Describe	e the unit to determine the cost of the activ	lities to be cor	nducted to d	close it.		
1.A	Type of tank system (aboveground or on-ground) ^b					
1.B	Maximum permitted capacity of tank	15,000	gal			
1.C	Total length of ancillary piping	207.9	ft			
1.D	Maximum capacity of ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the capacity of ancillary piping)	36	gal			
1.E	Maximum capacity of tank and ancillary piping (Add lines 1.B and 1.C)	15,036	gal			
1.F	Type of secondary containment system	Vault Lined (e-wall tank containmen (explain)	t system (external to	tank)	
2 INTERIO	OR SURFACE AREA OF TANK SYSTEM					
Determi	ne the interior surface area of the tank syst	tem to determi	ine costs of	decontamination.		
2.A	Interior surface area of tank (Refer to Page 4 of 5 of this worksheet for guidance on estimating the interior surface area of a tank.)	878.0	ft²			
2.B	Ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the interior surface area of ancillary piping.)	112.3	ft²			
2.C	Surface Area of Tank System (Add lines	2.A and 2.B)		990.3	ft²	
2.D				110.0	yd²	

INVENTORY - Page 2 of 2

3 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Determine the surface area of the secondary containment system pad to calculate costs for decontaminating and demolishing the pad. Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure.

3.A	Length	ft		
3.B	Width	ft		
3.C	3.C Surface Area of Secondary Containment System Pad (Multiply line 3.A by line 3.B)			ft²
3.D				yd²

4 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Calculate the volume of the secondary containment system pad to determine the cost of removing the pad. Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure.

4.A	Thickness	ft	
4.B	Thickness in yards (Divide line 4.A by 3)	yd	
4.C	Volume of Secondary Containment Syste line 3.D by line 4.B)	m Pad in yd³ (Multiply	yd³

5 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM BERM

Calculate the interior surface area of the secondary containment system berm, or curbing, to determine the cost of decontaminating and demolishing the berm. Demolition of the secondary containment system berm is an additional activity that might be conducted if the owner or operator intends to demolish the berm at the time of closure.

5.A	Length	ft	
5.B	Height	ft	
5.C	Surface Area of Secondary Containment line 5.A by line 5.B)	ft²	
5.D	Surface Area of Secondary Containment System Berm in yd ² (Divide line 5.C by 9)		yd²

- For example, if a secondary containment system pad is circular in shape rather than rectangular, the user would be unable to calculate the surface area of that pad using the method prescribed in section 2 of this inventory worksheet. Rather, the surface area of such a pad could be calculated using the equation πr^2 .
- Owners and operators of in-ground and underground storage tanks are not eligible to use standardized permits.

REMOVAL OF WASTE - Page 1 of 1

1	Maximum volume of waste to be removed from the tank and ancillary piping (Enter from worksheet TS-2, line 1.E)	15,036	gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hour ^b	\$		
4	Work rate required to remove waste from tank and ancillary piping ^c		work hr/gal	
5	Number of hours required to remove waste from tank and ancillary piping (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	3	work hrs	
	L COST OF REMOVAL OF WASTE FROM TANK G (Multiply line 3 by line 5) (Enter total on Works	\$322		

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to remove waste from the unit.
- Enter the estimated number of hours required to remove one gallon of waste from the tank system. If, for example, it will take 1 minute to remove each gallon of waste from the system, enter a work rate of 0.017 (1 divided by 60) for removing the waste. If an estimate of the total number of hours required to remove waste from the tank and ancillary piping has already been formulated, you may bypass this step and enter that number directly on line 5.

FLUSHING THE TANK AND PIPING - Page 1 of 2

1	Maximum capacity of the tank and ancillary piping (Enter from Worksheet TS-2, line 1.E)	15,036	gal	
2	Number of times tank and ancillary piping will be flushed (if unknown, assume 1)	1		
3	Total volume of flushing solution (Multiply line 1 by line 2)	15,036	gal	
4	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
5	Labor and equipment cost per work hour ^b	\$		
6	Work rate required to flush tank and ancillary piping ^c		work hr/gal	
7	Number of hours required to flush tank and ancillary piping (Multiply line 3 by line 6) (One hour minimum; round up to the halfhour)	5.5	work hrs	
8	Subtotal of labor and equipment costs to flush tank and ancillary piping (Multiply line 5 by line 7)			\$590
9	Total volume of flushing solution (Enter from line 3). (The flushing solution generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B (for water-based flushing solution) or TS-12 and TS-13A (for a solvent solution) to calculate the transportation, treatment, and disposal cost. If the flushing solution is to be placed in drums, complete lines 10 through 12.)	15,036	gal	
10	Number of drums required to contain flushing solution (Divide line 9 by 55 gallons per drum; round up to the nearest whole number)		drums	
11	Cost of one drum	\$	/drum	
12	Cost of drums needed to contain flushing solution (Multiply line 10 by line 11)			\$0
TOTAL COST OF FLUSHING OF TANK AND ANCILLARY PIPING (Add lines 8 and 12) (Enter total on Worksheet TS-1, line 3)			\$590	

Remember to calculate costs for transporting, treating, and disposing of the wastes in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If the wastes are to be managed as a bulk liquid, use worksheet TS-13B.

FLUSHING THE TANK AND PIPING - Page 2 of 2

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to flush the tank system.
- Enter the estimated number of hours required to flush the tank system for every one gallon of flushing solution. If, for example, it will take 1 minute for every gallon of flushing solution to flush the tank system, enter a work rate of 0.017 (1 divided by 60) for flushing the tank and piping. If an estimate of the total number of hours required to flush the tank and piping has already been formulated, you may bypass this step and enter that number directly on line 7.

DECONTAMINATION SUMMARY SHEET - Page 1 of 1

Facility Name: 15,000 Gallons - Left In Place

DECONTAMINATION SUMMARY WORKSHEET				
	Activity	Worksheet Number	Cost (\$)	
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	TS-10A	2,772	
2.	Decontamination of Unit by Sandblasting	TS-10B		
3.	Decontamination of Heavy Equipment	TS-10C		
TOTA Work	\$2,772			

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	990.3	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft ²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	27.0	work hrs	
6	Subtotal of labor and equipment cost to decontaminate the unit by steam cleaning or pressure washing (Multiply line 3 by line 5)			\$1,821
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²) ^d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	3,961	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING (For bulk liquids, enter from line 6. For liquids in drums, add lines 6 and 10.) (Enter total on Worksheet TS-10, line 1)			\$1,821

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

TANK SYSTEMS

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

		1		
1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	942.8	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	25.5	work hrs	
6	Subtotal of labor and equipment cost to decontaminate the unit by steam cleaning or pressure washing (Multiply line 3 by line 5)			\$951
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²) ^d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	3,771	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING (For bulk liquids, enter from line 6. For liquids in drums, add lines 6 and 10.) (Enter total on Worksheet TS-10, line 1)			\$951

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: 15,000 Gallons - Left in Place

SAMPLING AND ANALYSIS SUMMARY WORKSHEET					
	Activity	Worksheet Number	Cost (\$)		
1.	Drilling and Subsurface Soil Sampling & Analysis	TS-11B			
2.	Concrete Core Sampling & Analysis	TS-11C			
3.	Wipe Sampling & Analysis	TS-11D	555		
4.	Surface Water/Liquid Sampling & Analysis	TS-11E	2,033		
5.	Soil/Sludge/Sediment Sampling & Analysis	TS-11F	508		
TOTA on W	\$3,096				

SAMPLE INVENTORY - Page 1 of 2

The information entered on this inventory worksheet will be used in completing the appropriate worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES				
	be collected for each in		ne number of subsurface e total number of sample	
1	Number of Subsurface Soil Samples			
	Boring Diameter:			
		boreholes	samples/borehole	total samples
2 NUMBEI	R OF CONCRETE CORE	SAMPLES		
		mber of concrete core sa s to be collected in the b	amples to be collected foox provided.	r each individual unit.
2	Number of Concrete C	Core Samples		total samples
3 NUMBEI	R OF WIPE SAMPLES			
			s and the number of wip Imber of samples to be c	
3	Number of Wipe Samples			
		locations	samples/location	1 total samples
4 NUMBEI	R OF SURFACE WATER	/LIQUID SAMPLES		
In the space below, identify the number of grab samples taken on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.				
4	Number of Aqueous Samples			
		locations	samples/location	4 total samples

SAMPLE INVENTORY - Page 2 of 2

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES					
In the space below, identify the number of grab samples taken of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.					
5 Number of Nonaqueous Samples					
		locations	samples/location	1	total samples

WIPE SAMPLING & ANALYSIS - Page 1 of 1

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1 COLL	ECTING WIPE SAMPLES			
1.A	Number of wipe samples to be collected (Enter from worksheet TS-11A, line 3)	1	samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
1.C	Labor and equipment cost per work hourb	\$		
1.D	Work rate required to collect one sample ^c		work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0	work hrs	
1.F	1.F Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)			\$138
2 ANAI	LYZING WIPE SAMPLES			
2.A	Cost of analysis per sampling event for wipe samples (Enter from Page 2 of 2 of this worksheet)	\$139	/event	
2.B	Number of sampling events	3	events	
2.C	2.C Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)			\$417
_	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet TS-11, line 3)			\$555

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.
- Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SURFACE WATER/LIQUID SAMPLING & ANALYSIS - Page 1 of 1

Surface water/liquid samples are grab samples taken from lakes, rivers, or ponds, and samples taken of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLL	1 COLLECTING SURFACE WATER/LIQUID SAMPLES			
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet TS-11A, line 4)	4	samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a		level of PPE	
1.C	Labor and equipment cost per work hourb			
1.D	Work rate required to collect one sample ^c	W	ork hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	4.0	work hrs	
1.F	F Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)			\$365
2 ANAI	YZING SURFACE WATER/LIQUID SAMPLES			
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	\$139	/event	
2.B	Number of sampling events	12	events	
2.C	2.C Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)			\$1,668
TOTAL COST OF COLLECTION AND ANALYSIS OF SURFACE WATER/LIQUID SAMPLES (Add lines 1.F to line 2.C) (Enter total on Worksheet TS-11, line 4)			\$2,033	

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect surface water/liquid samples.
- Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SOIL/SLUDGE/SEDIMENT SAMPLING & ANALYSIS - Page 1 of 1

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

1	COLL	ECTING SOIL/SLUDGE/SEDIMENT SAMPLES			
	1.A	Number of soil/sludge/sediment samples to be collected (Enter from worksheet TS-11A, line 5)	1	samples	
	1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
	1.C	Labor and equipment cost per work hourb	\$		
	1.D	Work rate required to collect one sample ^c		work hr/sample	
	1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1	work hrs	
	1.F	F Cost to Collect Soil/Sludge/Sediment Samples (Multiply line 1.C by line 1.E)			\$91
2	ANAL	YZING SOIL/SLUDGE/SEDIMENT SAMPLES			
	2.A	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	\$13	39 /event	
	2.B	Number of sampling events	3	events	
	2.C Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)			\$417	
	TOTAL COST OF COLLECTION AND ANALYSIS OF SOIL/SLUDGE/SEDIMENT SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet TS-11, line 5)			\$508	

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.
- Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

TRANSPORTATION OF WASTE - Page 1 of 1

Depending on the activities being conducted, it may not be necessary to complete all sections of the transportation worksheet.

1 TRANSPORTATION OF WASTE IN DRUMS				
1.A	Number of drums of waste		drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)		truckloads	
1.D	Cost to Transport Waste In Drums (Multiply lin	e 1.B by li	ine 1.C)	\$
2 TRAN	ISPORTATION OF BULK LIQUIDS			
2.A	Gallons of liquid waste	15,036	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	3	truckloads	
2.D	Cost to Transport Bulk Liquid Waste (Multiply	line 2.B by	line 2.C)	\$3,263
3 TRANSPORTATION OF BULK WASTE				
3.A	Number of waste debris boxes		debris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
3.C	3.C Cost to Transport Bulk Solid Waste (assume one debris box can be hauled on each truck) (Multiply line 3.A by line 3.B)			\$
	AL COST TO TRANSPORT WASTE (Add lines 1. on Worksheet TS-1, line 10)	D, 2.D, and	d 3.C) (Enter	\$3,263

TREATMENT AND DISPOSAL SUMMARY SHEET - Page 1 of 1

Facility Name: 15,000 Gallons - Left in Place

SUMMARY WORKSHEET				
	Activity	Worksheet Number	Cost (\$)	
1.	Treatment and Disposal of Waste	TS-13A		
2.	Transportation and Disposal of Decontamination Fluids	TS-13B	25,086	
	TOTAL COST OF TREATMENT AND DISPOSAL (Add lines 1 and 2) (Enter total on Worksheet TS-1, line 11) \$25,086			

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 1 of 2

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. gal gal gal gal gal gal	22,768 total gal		
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D level of PPE		
3	Labor and equipment cost per work hour ^b	\$		
4	Work rate to pump decontamination fluid to a holding tank (per gallon) ^c	work hrs/gallon		
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	2 work hours		
6	Subtotal of labor and equipment cost to pum to a holding tank (multiply line 3 by line 5)	p decontamination fluid	\$85	
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days		
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	\$ /day		
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	3 tanks		
10	Subtotal of tank rental costs (Multiply lines 7	, 8, and 9)	\$1,095	
11	Removal cost per gallon of bulk liquid ^d	\$ /gal		
12	Subtotal of removal cost for bulk liquids (Mul	tiply line 1 by line 11)	\$23,906	
	TOTAL COST TO TRANSPORT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID (Add lines 6, 10, and 12) (Enter total on Worksheet TS-13, line 2)			

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.
- Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already bee formulated, you may bypass this step and enter that number directly on line 5.
- d Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure	1	
2	Cost of certification of closure per unit ^b	\$	
	TOTAL COST OF CERTIFICATION OF CLC by line 2) (Enter total on Worksheet TS-1,		\$3,640

- Facilities closing multiple tanks in the same manner at the same time should incur cost of certification of closure only once.
- This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK LEFT IN PLACE AT CLOSURE - CAPACITY 15,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 15,000 Gallons - Left in Place -Ignitable Waste

	SUMMARY WORKSHEET			
of closure might into effect clo	Activity Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number			
1.	Removal of Waste	TS-3	322	
2.	Tank System Purging (ignitible wastes only)	TS-4	355	
3.	Flushing the Tank and Piping	TS-5	590	
4.	Disassembly and Loading	TS-6		
5.	Demolition and Removal of Containment System	TS-7		
6.	Removal of Soil	TS-8		
7.	Backfill	TS-9		
8.	Decontamination	TS-10	2,772	
9.	Sampling and Analysis	TS-11	3,096	
10.	Transportation	TS-12	3,263	
11.	Treatment and Disposal	TS-13	25,086	
12.	Subtotal of Closure Costs (Add lines 1 through 11)		35,484	
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	3,548		
14.	Certification of Closure	TS-14	3,640	
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			42,672	
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			8,534	
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$51,206	

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	15,036	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	225.5	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply line	2 by line 3)	\$226
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	4.0	work hrs	
9	Labor cost to purge tank system (Multiply line	6 by line 8)		\$129
	TOTAL COST OF TANK SYSTEM PURGING (Add lines 4 and 9) (Enter total on Worksheet TS-1, line 2)			\$355

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMAT	ING WORKSHEETS	FOR CLOSURE OF	A TANK SYSTEM
TANK REP	MOVED AT CLOSURI	E - CAPACITY 15,00	0 GALLONS

Facility Name: 15,000 Gallons - Removed at Closure

SUMMARY WORKSHEET				
of closure might into effect clo	Activity the activities listed below are conducted routinely as part e of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of itional activities are listed in italic type.	Worksheet Number	Cost (\$)	
1.	Removal of Waste	TS-3	322	
2.	Tank System Purging (ignitible wastes only)	TS-4		
3.	Flushing the Tank and Piping	TS-5	590	
4.	Disassembly and Loading	TS-6	2,074	
5.	Demolition and Removal of Containment System	TS-7		
6.	Removal of Soil	TS-8		
7.	Backfill	TS-9		
8.	Decontamination	TS-10	2,772	
9.	Sampling and Analysis	TS-11	3,096	
10.	Transportation	TS-12	3,263	
11.	Treatment and Disposal	TS-13	25,086	
12.	Subtotal of Closure Costs (Add lines 1 through 11)		37,203	
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	3,720	
14.	Certification of Closure	TS-14	3,640	
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			44,563	
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			8,913	
ТОТА	L COST OF CLOSURE (add lines 15 and 16)		\$53,476	

DISASSEMBLY AND LOADING - Page 1 of 2

This worksheet can be used to determine the costs of disassembling and loading above ground or onground tanks and ancillary piping. $^{\rm a}$

1 DISA	SSEMBLY OF ANCILLARY PIPING			
1.A	Length of ancillary piping to be disassembled (Enter from worksheet TS-2, line 1.C)	207.9	ft	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	level of PPE	
1.C	Labor and equipment cost per work hour ^c	\$		
1.D	Work rate required to disassemble one ft of pipe ^d		work hr/ft	
1.E	Number of hours required to disassemble ancillary piping (Multiply line 1.A by line 1.D) (One hour minimum; round up to the halfhour)	31.5	work hrs	
1.F	Cost to Disassemble Ancillary Piping (Multiply	line 1.C b	y line 1.E)	\$1,400
2 LOAD	DING			
2.A	Capacity of tank (Enter from worksheet TS-2, line 1.B)	15,000	gal	
2.A 2.B		15,000 D	gal level of PPE	
	TS-2, line 1.B) Level of PPE assumed for this activity		-	
2.B	TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	-	
2.B 2.C	TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon	D	level of PPE work hr/	
2.B 2.C 2.D	TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon capacity ^f Number of hours required to load tank (Multiply line 2.A by line 2.D) (One hour	D \$ 15.0	level of PPE work hr/ gal capacity	\$674

DISASSEMBLY AND LOADING - Page 2 of 2

- Owners and operators of in-ground and underground tank systems are not eligible to use standard permits.
- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to disassemble ancillary piping.
- d Enter the estimated number of work hours required to disassemble one foot of ancillary piping. If, for example, it will take 10 minutes to disassemble each foot of ancillary piping, enter a work rate of 0.167 (10 divided by 60) for disassembling the piping. If an estimate of the total number of hours required to disassemble the piping has already been formulated, you may bypass this step and enter that number directly on line 1.E.
- Enter the estimated cost per work hour of all labor and equipment needed to load components of the onground or aboveground tank system. In addition to costs for labor, this cost should include the average cost per work hour of rental of all equipment and purchase of all supplies needed to conduct this activity.
- Enter the estimated number of work hours per gallon of capacity required to load the components of the on-ground or aboveground tank system. If, for example, it will take 1 minute for every gallon of capacity to load components of the tank system, enter a work rate of 0.017 (1 divided by 60) for loading the system. If an estimate of the total number of hours required to load the tank system has already been formulated, you may bypass this step and enter that number directly on line 2.E.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK REMOVED AT CLOSURE - CAPACITY 15,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 15,000 Gallons - Removed at Closure -Ignitable Waste

SUMMARY WORKSHEET					
of closure might inte effect clo	Activity Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number				
1.	Removal of Waste	TS-3	322		
2.	Tank System Purging (ignitible wastes only)	TS-4	355		
3.	Flushing the Tank and Piping	TS-5	590		
4.	Disassembly and Loading	TS-6	2,074		
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	2,772		
9.	Sampling and Analysis	TS-11	3,096		
10.	Transportation	TS-12	3,263		
11.	Treatment and Disposal	TS-13	25,086		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		37,558		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	3,756		
14.	Certification of Closure	TS-14	3,640		
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			44,954		
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			8,991		
TOTAI	COST OF CLOSURE (add lines 15 and 16)		\$53,945		

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	15,036	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	225.5	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply line	2 by line 3)	\$226
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	4.0	work hrs	
9	Labor cost to purge tank system (Multiply line	6 by line 8)		\$129
TOTAL COST OF TANK SYSTEM PURGING (Add lines 4 and 9) (Enter total on Worksheet TS-1, line 2)				\$355

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMATING WORKSHEETS FOR CLOSURE TANK LEFT IN PLACE AT CLOSURE - CAPACITY	OF A TANK SYSTEM 7 20,000 GALLONS

Facility Name: 20,000 Gallons - Left in Place

	SUMMARY WORKSHEET				
of closure might into effect clo	Activity the activities listed below are conducted routinely as part e of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of tional activities are listed in italic type.	Worksheet Number	Cost (\$)		
1.	Removal of Waste	TS-3	376		
2.	Tank System Purging (ignitible wastes only)	TS-4			
3.	Flushing the Tank and Piping	TS-5	751		
4.	Disassembly and Loading	TS-6			
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	3,494		
9.	Sampling and Analysis	TS-11	4,571		
10.	Transportation	TS-12	3,263		
11.	Treatment and Disposal	TS-13	32,613		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		45,068		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	4,507		
14.	Certification of Closure	TS-14	3,640		
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			53,215		
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			10,643		
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$63,858		

INVENTORY - Page 1 of 2

The information entered in this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the cost of closure for tank systems. If the design characteristics of the tank system to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures, soils, and materials to be removed. Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete all sections of this inventory worksheet.

1 UNIT DESCRIPTION AND MAXIMUM PERMITTED CAPACITY					
	e the unit to determine the cost of the activ		ducted to	close it.	
1.A	Type of tank system (aboveground or on-ground) ^b				
1.B	Maximum permitted capacity of tank	20,000	gal		
1.C	Total length of ancillary piping	277.2	ft		
1.D	Maximum capacity of ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the capacity of ancillary piping)	48	gal		
1.E	Maximum capacity of tank and ancillary piping (Add lines 1.B and 1.C)	20,048	gal		
1.F	Vault			t system (external to ta	nk)
2 INTERIC	OR SURFACE AREA OF TANK SYSTEM				
Determi	ne the interior surface area of the tank sys	tem to determin	ne costs of	decontamination.	
2.A	Interior surface area of tank (Refer to Page 4 of 5 of this worksheet for guidance on estimating the interior surface area of a tank.)	1,060.0	ft²		
2.B	Ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the interior surface area of ancillary piping.)	149.7	ft²		
2.C	2.C Surface Area of Tank System (Add lines 2.A and 2.B)			1,209.7	ft²
2.D	2.D Surface Area of Tank System in yd² (Divide line 2.C by 9)			134.4	yd²

INVENTORY - Page 2 of 2

3 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Determine the surface area of the secondary containment system pad to calculate costs for decontaminating and demolishing the pad. Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure.

3.A	Length	ft		
3.B	Width	ft		
3.C	3.C Surface Area of Secondary Containment System Pad (Multiply line 3.A by line 3.B)			ft²
3.D				yd²

4 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Calculate the volume of the secondary containment system pad to determine the cost of removing the pad. Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure.

4.A	Thickness	ft	
4.B	Thickness in yards (Divide line 4.A by 3)	yd	
4.C	Volume of Secondary Containment Syste line 3.D by line 4.B)	m Pad in yd³ (Multiply	yd³

5 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM BERM

Calculate the interior surface area of the secondary containment system berm, or curbing, to determine the cost of decontaminating and demolishing the berm. Demolition of the secondary containment system berm is an additional activity that might be conducted if the owner or operator intends to demolish the berm at the time of closure.

5.A	Length	ft	
5.B	Height	ft	
5.C	Surface Area of Secondary Containment line 5.A by line 5.B)	ft²	
5.D	Surface Area of Secondary Containment (Divide line 5.C by 9)	yd²	

- For example, if a secondary containment system pad is circular in shape rather than rectangular, the user would be unable to calculate the surface area of that pad using the method prescribed in section 2 of this inventory worksheet. Rather, the surface area of such a pad could be calculated using the equation πr^2 .
- Owners and operators of in-ground and underground storage tanks are not eligible to use standardized permits.

REMOVAL OF WASTE - Page 1 of 1

1	Maximum volume of waste to be removed from the tank and ancillary piping (Enter from worksheet TS-2, line 1.E)	20,048	gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate required to remove waste from tank and ancillary piping ^c		work hr/gal	
5	Number of hours required to remove waste from tank and ancillary piping (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	3.5	work hrs	
TOTAL COST OF REMOVAL OF WASTE FROM TANK AND ANCILLARY PIPING (Multiply line 3 by line 5) (Enter total on Worksheet TS-1, line 1)				\$376

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to remove waste from the unit.
- Enter the estimated number of hours required to remove one gallon of waste from the tank system. If, for example, it will take 1 minute to remove each gallon of waste from the system, enter a work rate of 0.017 (1 divided by 60) for removing the waste. If an estimate of the total number of hours required to remove waste from the tank and ancillary piping has already been formulated, you may bypass this step and enter that number directly on line 5.

FLUSHING THE TANK AND PIPING - Page 1 of 2

1	Maximum capacity of the tank and ancillary piping (Enter from Worksheet TS-2, line 1.E)	20,048	gal	
2	Number of times tank and ancillary piping will be flushed (if unknown, assume 1)	1		
3	Total volume of flushing solution (Multiply line 1 by line 2)	20,048	gal	
4	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
5	Labor and equipment cost per work hour ^b	\$		
6	Work rate required to flush tank and ancillary piping ^c		work hr/gal	
7	Number of hours required to flush tank and ancillary piping (Multiply line 3 by line 6) (One hour minimum; round up to the halfhour)	7.0	work hrs	
8	Subtotal of labor and equipment costs to flush piping (Multiply line 5 by line 7)	•		\$751
9	Total volume of flushing solution (Enter from line 3). (The flushing solution generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B (for water-based flushing solution) or TS-12 and TS-13A (for a solvent solution) to calculate the transportation, treatment, and disposal cost. If the flushing solution is to be placed in drums, complete lines 10 through 12.)	20,048	gal	
10	Number of drums required to contain flushing solution (Divide line 9 by 55 gallons per drum; round up to the nearest whole number)		drums	
11	Cost of one drum	\$	/drum	
12	Cost of drums needed to contain flushing solution (Multiply line 10 by line 11)			\$0
	L COST OF FLUSHING OF TANK AND ANCILLAR 2) (Enter total on Worksheet TS-1, line 3)	RY PIPING	(Add lines 8	\$751

Remember to calculate costs for transporting, treating, and disposing of the wastes in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If the wastes are to be managed as a bulk liquid, use worksheet TS-13B.

FLUSHING THE TANK AND PIPING - Page 2 of 2

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to flush the tank system.
- Enter the estimated number of hours required to flush the tank system for every one gallon of flushing solution. If, for example, it will take 1 minute for every gallon of flushing solution to flush the tank system, enter a work rate of 0.017 (1 divided by 60) for flushing the tank and piping. If an estimate of the total number of hours required to flush the tank and piping has already been formulated, you may bypass this step and enter that number directly on line 7.

DECONTAMINATION SUMMARY SHEET - Page 1 of 1

Facility Name: 20,000 Gallons - Left In Place

D	DECONTAMINATION SUMMARY WORKSHEET				
	Activity	Worksheet Number	Cost (\$)		
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	TS-10A	3,494		
2.	Decontamination of Unit by Sandblasting	TS-10B			
3.	Decontamination of Heavy Equipment	TS-10C			
TOTA Work	\$3,494				

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	1,209.7	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	33.0	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply I			\$2,226
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²) ^d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	4,839	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$2,226		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	1,257.1	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	34.0	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply I			\$1,268
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²) ^d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	5,028	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$1,268		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: 20,000 Gallons - Left in Place

SAMPLING AND ANALYSIS SUMMARY WORKSHEET						
	Worksheet Activity Number Cost (\$)					
1.	Drilling and Subsurface Soil Sampling & Analysis	TS-11B				
2.	Concrete Core Sampling & Analysis	TS-11C	458			
3.	Wipe Sampling & Analysis	TS-11D	555			
4.	Surface Water/Liquid Sampling & Analysis	TS-11E	3,050			
5.	Soil/Sludge/Sediment Sampling & Analysis	TS-11F	508			
	TOTAL SAMPLING AND ANALYSIS COST (Add lines 1 through 5) (Enter total on Worksheet TS-1, line 9) \$4,571					

SAMPLE INVENTORY - Page 1 of 2

The information entered on this inventory worksheet will be used in completing the appropriate worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBEI	1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES				
In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.					
1	Number of Subsurface Soil Samples				
	Boring Diameter:				
		boreholes	samples/borehole	total samples	
2 NUMBEI	R OF CONCRETE CORE	SAMPLES			
		mber of concrete core sa s to be collected in the b	amples to be collected fo ox provided.	r each individual unit.	
2	Number of Concrete C	Core Samples		1 total samples	
3 NUMBEI	R OF WIPE SAMPLES				
	In the space below, identify the number of sample locations and the number of wipe samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.				
3	Number of Wipe Samples				
		locations	samples/location	1 total samples	
4 NUMBEI	4 NUMBER OF SURFACE WATER/LIQUID SAMPLES				
In the space below, identify the number of grab samples taken on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.					
4	Number of Aqueous Samples				
		locations	samples/location	6 total samples	

SAMPLE INVENTORY - Page 2 of 2

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES						
In the space below, identify the number of grab samples taken of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.						
5	5 Number of Nonaqueous Samples					
		locations	samples/location	1	total samples	

CONCRETE CORE SAMPLING & ANALYSIS - Page 1 of 1

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1 COLLECTING CONCRETE CORE SAMPLES					
1.A	Number of concrete core samples to be collected (Enter from worksheet TS-11A, line 2)	1	core samples		
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE		
1.C	Labor and equipment cost per work hourb	\$			
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6-inches ^c		work hr/sample		
1.E	Number of hours required to drill 3-inch- diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	1	work hrs		
1.F Cost to Collect Concrete Core Samples (Multiply line 1.C by line 1.E)				\$41	
2 ANAI	LYZING CONCRETE CORE SAMPLES				
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	\$139	9 /event		
2.B	Enter the number of sampling events	3	events		
2.C	2.C Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)			\$417	
TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on worksheet TS-11, line 2)				\$458	

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.
- Enter the estimated number of work hours required to drill a 3-inch diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

WIPE SAMPLING & ANALYSIS - Page 1 of 1

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1 COLLE	CTING WIPE SAMPLES			
1.A	Number of wipe samples to be collected (Enter from worksheet TS-11A, line 3)	1	samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
1.C	Labor and equipment cost per work hourb	\$		
1.D	Work rate required to collect one sample ^c		work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0	work hrs	
1.F	Cost to Collect Wipe Samples (Multiply line 1.	C by lin	e 1.E)	\$138
2 ANALY	ZING WIPE SAMPLES			
2.A	Cost of analysis per sampling event for wipe samples (Enter from Page 2 of 2 of this worksheet)	\$139	/event	
2.B	Number of sampling events	3	events	
2.C	Cost to Analyze Wipe Samples (Multiply line 2	.A by li	ne 2.B)	\$417
_	COST OF COLLECTION AND ANALYSIS OF W .F and 2.C) (Enter total on Worksheet TS-11, lir		MPLES (Add	\$555

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.
- Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SURFACE WATER/LIQUID SAMPLING & ANALYSIS - Page 1 of 1

Surface water/liquid samples are grab samples taken from lakes, rivers, or ponds, and samples taken of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLE	CTING SURFACE WATER/LIQUID SAMPLES			
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet TS-11A, line 4)	6	samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a		level of PPE	
1.C	Labor and equipment cost per work hourb			
1.D	Work rate required to collect one sample ^c	W	ork hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	6.0	work hrs	
1.F	Cost to Collect Surface Water/Liquid Samples line 1.E)	(Multiply li	ne 1.C by	\$548
2 ANAI	YZING SURFACE WATER/LIQUID SAMPLES			
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	\$139	/event	
2.B	Number of sampling events	18	events	
2.C	Cost to Analyze Surface Water/Liquid Samples line 2.B)	(Multiply	line 2.A by	\$2,502
WAT	AL COST OF COLLECTION AND ANALYSIS OF SER/LIQUID SAMPLES (Add lines 1.F to line 2.C) sheet TS-11, line 4)		al on	\$3,050

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect surface water/liquid samples.
- Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SOIL/SLUDGE/SEDIMENT SAMPLING & ANALYSIS - Page 1 of 1

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

1	COLL	ECTING SOIL/SLUDGE/SEDIMENT SAMPLES			
	1.A	Number of soil/sludge/sediment samples to be collected (Enter from worksheet TS-11A, line 5)	1	samples	
	1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
	1.C	Labor and equipment cost per work hourb	\$		
	1.D	Work rate required to collect one sample ^c		work hr/sample	
	1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1	work hrs	
	1.F	Cost to Collect Soil/Sludge/Sediment Samples line 1.E)	(Mult	iply line 1.C by	\$91
2	ANAL	YZING SOIL/SLUDGE/SEDIMENT SAMPLES			
	2.A	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	\$13	39 /event	
	2.B	Number of sampling events	3	events	
	2.C	Cost to Analyze Soil/Sludge/Sediment Samples line 2.B)	(Mu	Itiply line 2.A by	\$417
	SOIL/	AL COST OF COLLECTION AND ANALYSIS OF SLUDGE/SEDIMENT SAMPLES (Add lines 1.F at sheet TS-11, line 5)	nd 2.0	C) (Enter total on	\$508

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.
- Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

TRANSPORTATION OF WASTE - Page 1 of 1

Depending on the activities being conducted, it may not be necessary to complete all sections of the transportation worksheet.

				1
1 TRAN	ISPORTATION OF WASTE IN DRUMS			
1.A	Number of drums of waste		drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)		truckloads	
1.D	Cost to Transport Waste In Drums (Multiply lin	e 1.B by lir	ne 1.C)	\$
2 TRAN	ISPORTATION OF BULK LIQUIDS			
2.A	Gallons of liquid waste	20,048	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	3	truckloads	
2.D	Cost to Transport Bulk Liquid Waste (Multiply	line 2.B by	line 2.C)	\$3,263
3 TRAN	ISPORTATION OF BULK WASTE			
3.A	Number of waste debris boxes		debris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
3.C	Cost to Transport Bulk Solid Waste (assume of hauled on each truck) (Multiply line 3.A by line		ox can be	\$
	AL COST TO TRANSPORT WASTE (Add lines 1.1 on Worksheet TS-1, line 10)	D, 2.D, and	I 3.C) (Enter	\$3,263

TREATMENT AND DISPOSAL SUMMARY SHEET - Page 1 of 1

Facility Name: 20,000 Gallons - Left in Place

	SUMMARY WORKSH	HEET	
	Activity	Worksheet Number	Cost (\$)
1.	Treatment and Disposal of Waste	TS-13A	
2.	Transportation and Disposal of Decontamination Fluids	TS-13B	32,613
	COST OF TREATMENT AND DISPOSAL (Add li	nes 1 and 2)	\$32,613

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 1 of 2

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. gal gal gal gal gal	29,915 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D level of PPE	
3	Labor and equipment cost per work hour ^b	\$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon) ^c	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	2 work hours	
6	Subtotal of labor and equipment cost to pum to a holding tank (multiply line 3 by line 5)	p decontamination fluid	\$107
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	\$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	3 tanks	
10	Subtotal of tank rental costs (Multiply lines 7	, 8, and 9)	\$1,095
11	Removal cost per gallon of bulk liquid ^d	\$ /gal	
12	Subtotal of removal cost for bulk liquids (Mul	tiply line 1 by line 11)	\$31,411
	COST TO TRANSPORT AND DISPOSE OF DECULK LIQUID (Add lines 6, 10, and 12) (Enter to 2)		\$32,613

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.
- Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already bee formulated, you may bypass this step and enter that number directly on line 5.
- Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure	1	
2	Cost of certification of closure per unit ^b	\$	
	AL COST OF CERTIFICATION OF CLOSURE (Mul r total on Worksheet TS-1, line 14)	tiply line 1 by line 2)	\$3,640

- ^a Facilities closing multiple tanks in the same manner at the same time should incur cost of certification of closure only once.
- This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK LEFT IN PLACE AT CLOSURE - CAPACITY 20,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 20,000 Gallons - Left in Place -Ignitable Waste

	SUMMARY WORKSH	IEET	
of closure might inte effect clo	Activity the activities listed below are conducted routinely as part of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of tional activities are listed in italic type.	Worksheet Number	Cost (\$)
1.	Removal of Waste	TS-3	376
2.	Tank System Purging (ignitible wastes only)	TS-4	462
3.	Flushing the Tank and Piping	TS-5	751
4.	Disassembly and Loading	TS-6	
5.	Demolition and Removal of Containment System	TS-7	
6.	Removal of Soil	TS-8	
7.	Backfill	TS-9	
8.	Decontamination	TS-10	3,494
9.	Sampling and Analysis	TS-11	4,571
10.	Transportation	TS-12	3,263
11.	Treatment and Disposal	TS-13	32,613
12.	Subtotal of Closure Costs (Add lines 1 through 11)		45,530
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	4,553
14.	Certification of Closure	TS-14	3,640
15.	Subtotal (Add engineering expenses and cost of certification closure costs) (Add lines 12, 13, and 14)	ion of closure to	53,723
16.	Contingency Allowance (approximately 20% of closure continuous and cost of certification of closure) (Multiply line)		10,745
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$64,468

Determine the total number of samples to be analyzed at the time of closure. The number of QC samples typically is estimated at 20 percent of the total number of samples to be analyzed.

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	20,048	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	300.7	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply line	e 2 by line 3)	\$301
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	5.0	work hrs	
9	Labor cost to purge tank system (Multiply line	6 by line 8))	\$161
	AL COST OF TANK SYSTEM PURGING (Add line orksheet TS-1, line 2)	s 4 and 9) ((Enter total	\$462

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMA	TING WORKSHEE	TS FOR CLOSUR	E OF A TANK SYS	STEM
TANK RE	EMOVED AT CLOS	URE - CAPACITY	20,000 GALLONS	

Facility Name: 20,000 Gallons - Removed at Closure

	SUMMARY WORKSH	IEET	
of closure might inte effect clos	Activity the activities listed below are conducted routinely as part of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of tional activities are listed in italic type.	Worksheet Number	Cost (\$)
1.	Removal of Waste	TS-3	376
2.	Tank System Purging (ignitible wastes only)	TS-4	
3.	Flushing the Tank and Piping	TS-5	751
4.	Disassembly and Loading	TS-6	2,765
5.	Demolition and Removal of Containment System	TS-7	
6.	Removal of Soil	TS-8	
7.	Backfill	TS-9	
8.	Decontamination	TS-10	3,494
9.	Sampling and Analysis	TS-11	4,571
10.	Transportation	TS-12	3,263
11.	Treatment and Disposal	TS-13	32,613
12.	Subtotal of Closure Costs (Add lines 1 through 11)		47,833
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	4,783
14.	Certification of Closure	TS-14	3,640
15.	Subtotal (Add engineering expenses and cost of certification closure costs) (Add lines 12, 13, and 14)	on of closure to	56,256
16.	Contingency Allowance (approximately 20% of closure continuous expenses, and cost of certification of closure) (Multiply line)	osts, engineering ne 15 by 0.20)	11,251
TOTAL	COST OF CLOSURE (add lines 15 and 16)		\$67,507

DISASSEMBLY AND LOADING - Page 1 of 2

This worksheet can be used to determine the costs of disassembling and loading above ground or onground tanks and ancillary piping. $^{\rm a}$

DISA	SSEMBLY OF ANCILLARY PIPING			
1.A	Length of ancillary piping to be disassembled (Enter from worksheet TS-2, line 1.C)	277.2	ft	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	level of PPE	
1.C	Labor and equipment cost per work hour ^c	\$		
1.D	Work rate required to disassemble one ft of pipe ^d		work hr/ft	
1.E	Number of hours required to disassemble ancillary piping (Multiply line 1.A by line 1.D) (One hour minimum; round up to the halfhour)	42.0	work hrs	
1.F	Cost to Disassemble Ancillary Piping (Multiply	line 1.C b	y line 1.E)	\$1,866
2 LOAI	DING	line 1.C b	y line 1.E)	\$1,866
		20,000	y line 1.E)	\$1,866
2 LOAI	DING Capacity of tank (Enter from worksheet			\$1,866
2 LOA I	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity	20,000	gal	\$1,866
2 LOAE 2.A 2.B	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b	20,000 D	gal	\$1,866
2 LOAE 2.A 2.B 2.C	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon	20,000 D	gal level of PPE work hr/	\$1,866
2 LOAE 2.A 2.B 2.C 2.D	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon capacity ^f Number of hours required to load tank (Multiply line 2.A by line 2.D) (One hour	20,000 D \$	gal level of PPE work hr/ gal capacity	\$899

DISASSEMBLY AND LOADING - Page 2 of 2

- Owners and operators of in-ground and underground tank systems are not eligible to use standard permits.
- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to disassemble ancillary piping.
- d Enter the estimated number of work hours required to disassemble one foot of ancillary piping. If, for example, it will take 10 minutes to disassemble each foot of ancillary piping, enter a work rate of 0.167 (10 divided by 60) for disassembling the piping. If an estimate of the total number of hours required to disassemble the piping has already been formulated, you may bypass this step and enter that number directly on line 1.E.
- Enter the estimated cost per work hour of all labor and equipment needed to load components of the onground or aboveground tank system. In addition to costs for labor, this cost should include the average cost per work hour of rental of all equipment and purchase of all supplies needed to conduct this activity.
- Enter the estimated number of work hours per gallon of capacity required to load the components of the on-ground or aboveground tank system. If, for example, it will take 1 minute for every gallon of capacity to load components of the tank system, enter a work rate of 0.017 (1 divided by 60) for loading the system. If an estimate of the total number of hours required to load the tank system has already been formulated, you may bypass this step and enter that number directly on line 2.E.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK REMOVED AT CLOSURE - CAPACITY 20,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 20,000 Gallons - Removed at Closure -Ignitable Waste

	SUMMARY WORKSHEET					
of closure might into effect clo	Activity Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number					
1.	Removal of Waste	TS-3	376			
2.	Tank System Purging (ignitible wastes only)	TS-4	462			
3.	Flushing the Tank and Piping	TS-5	751			
4.	Disassembly and Loading	TS-6	2,765			
5.	Demolition and Removal of Containment System	TS-7				
6.	Removal of Soil	TS-8				
7.	Backfill	TS-9				
8.	Decontamination	TS-10	3,494			
9.	Sampling and Analysis	TS-11	4,571			
10.	Transportation	TS-12	3,263			
11.	Treatment and Disposal	TS-13	32,613			
12.	Subtotal of Closure Costs (Add lines 1 through 11)		48,295			
13.						
14.	Certification of Closure	TS-14	3,640			
15.	56,765					
16.	11,353					
ТОТА	L COST OF CLOSURE (add lines 15 and 16)		\$68,118			

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	20,048	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	300.7	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply line	e 2 by line 3)	\$301
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	5.0	work hrs	
9	Labor cost to purge tank system (Multiply line 6 by line 8)			\$161
	AL COST OF TANK SYSTEM PURGING (Add line orksheet TS-1, line 2)	\$462		

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK LEFT IN PLACE AT CLOSURE - CAPACITY 25,000 GALLONS

Facility Name: 25,000 Gallons - Left in Place

	SUMMARY WORKSHEET					
of closure might inte effect clo	Activity Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number					
1.	Removal of Waste	TS-3	483			
2.	Tank System Purging (ignitible wastes only)	TS-4				
3.	Flushing the Tank and Piping	TS-5	966			
4.	Disassembly and Loading	TS-6				
5.	Demolition and Removal of Containment System	TS-7				
6.	Removal of Soil	TS-8				
7.	Backfill	TS-9				
8.	Decontamination	TS-10	4,214			
9.	Sampling and Analysis	TS-11	5,587			
10.	Transportation	TS-12	4,350			
11.	Treatment and Disposal	TS-13	40,567			
12.	Subtotal of Closure Costs (Add lines 1 through 11)		56,167			
13.	-					
14.	Certification of Closure	TS-14	3,640			
15.	65,424					
16.	13,085					
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$78,509			

INVENTORY - Page 1 of 2

The information entered in this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the cost of closure for tank systems. If the design characteristics of the tank system to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures, soils, and materials to be removed. Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete all sections of this inventory worksheet.

1 UNIT DESCRIPTION AND MAXIMUM PERMITTED CAPACITY					
	e the unit to determine the cost of the activ		ducted to	close it.	
1.A	Type of tank system (aboveground or on-ground) ^b				
1.B	Maximum permitted capacity of tank	25,000	gal		
1.C	Total length of ancillary piping	346.6	ft		
1.D	Maximum capacity of ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the capacity of ancillary piping)	60	gal		
1.E	Maximum capacity of tank and ancillary piping (Add lines 1.B and 1.C)	25,060	gal		
1.F	Vault			t system (external t	to tank)
2 INTERIO	OR SURFACE AREA OF TANK SYSTEM				
Determi	ne the interior surface area of the tank sys	tem to determin	ne costs of	decontamination.	
2.A	Interior surface area of tank (Refer to Page 4 of 5 of this worksheet for guidance on estimating the interior surface area of a tank.)	1,257.0	ft²		
2.B	Ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the interior surface area of ancillary piping.)	187.2	ft²		
2.C	Surface Area of Tank System (Add lines	2.A and 2.B)		1,444.2	ft²
2.D	2.D Surface Area of Tank System in yd² (Divide line 2.C by 9)			160.5	yd²

INVENTORY - Page 2 of 2

3 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Determine the surface area of the secondary containment system pad to calculate costs for decontaminating and demolishing the pad. Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure.

3.A	Length	ft		
3.B	Width	ft		
3.C	Surface Area of Secondary Containment System Pad (Multiply line 3.A by line 3.B)			ft²
3.D	Surface Area of Secondary Containment (Divide line 3.C by 9)	174.6	yd²	

4 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Calculate the volume of the secondary containment system pad to determine the cost of removing the pad. Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure.

4.A	Thickness	ft	
4.B	Thickness in yards (Divide line 4.A by 3)	yd	
4.C	Volume of Secondary Containment Syste line 3.D by line 4.B)	m Pad in yd³ (Multiply	yd³

5 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM BERM

Calculate the interior surface area of the secondary containment system berm, or curbing, to determine the cost of decontaminating and demolishing the berm. Demolition of the secondary containment system berm is an additional activity that might be conducted if the owner or operator intends to demolish the berm at the time of closure.

5.A	Length	ft	
5.B	Height	ft	
5.C	Surface Area of Secondary Containment line 5.A by line 5.B)	ft²	
5.D	Surface Area of Secondary Containment System Berm in yd ² (Divide line 5.C by 9)		yd²

- For example, if a secondary containment system pad is circular in shape rather than rectangular, the user would be unable to calculate the surface area of that pad using the method prescribed in section 2 of this inventory worksheet. Rather, the surface area of such a pad could be calculated using the equation πr^2 .
- Owners and operators of in-ground and underground storage tanks are not eligible to use standardized permits.

REMOVAL OF WASTE - Page 1 of 1

1	Maximum volume of waste to be removed from the tank and ancillary piping (Enter from worksheet TS-2, line 1.E)	25,060	gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate required to remove waste from tank and ancillary piping ^c		work hr/gal	
5	Number of hours required to remove waste from tank and ancillary piping (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	4.5	work hrs	
	L COST OF REMOVAL OF WASTE FROM TANK 6 (Multiply line 3 by line 5) (Enter total on Works	\$483		

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to remove waste from the unit.
- Enter the estimated number of hours required to remove one gallon of waste from the tank system. If, for example, it will take 1 minute to remove each gallon of waste from the system, enter a work rate of 0.017 (1 divided by 60) for removing the waste. If an estimate of the total number of hours required to remove waste from the tank and ancillary piping has already been formulated, you may bypass this step and enter that number directly on line 5.

FLUSHING THE TANK AND PIPING - Page 1 of 2

1	Maximum capacity of the tank and ancillary piping (Enter from Worksheet TS-2, line 1.E)	25,060	gal	
2	Number of times tank and ancillary piping will be flushed (if unknown, assume 1)	1		
3	Total volume of flushing solution (Multiply line 1 by line 2)	25,060	gal	
4	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
5	Labor and equipment cost per work hour ^b	\$		
6	Work rate required to flush tank and ancillary piping ^c		work hr/gal	
7	Number of hours required to flush tank and ancillary piping (Multiply line 3 by line 6) (One hour minimum; round up to the halfhour)	9.0	work hrs	
8	Subtotal of labor and equipment costs to flush piping (Multiply line 5 by line 7)	\$966		
9	Total volume of flushing solution (Enter from line 3). (The flushing solution generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B (for water-based flushing solution) or TS-12 and TS-13A (for a solvent solution) to calculate the transportation, treatment, and disposal cost. If the flushing solution is to be placed in drums, complete lines 10 through 12.)	25,060	gal	
10	Number of drums required to contain flushing solution (Divide line 9 by 55 gallons per drum; round up to the nearest whole number)		drums	
11	Cost of one drum	\$	/drum	
12	Cost of drums needed to contain flushing solution 11)	\$0		
	L COST OF FLUSHING OF TANK AND ANCILLAR 2) (Enter total on Worksheet TS-1, line 3)	(Add lines 8	\$966	

Remember to calculate costs for transporting, treating, and disposing of the wastes in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If the wastes are to be managed as a bulk liquid, use worksheet TS-13B.

FLUSHING THE TANK AND PIPING - Page 2 of 2

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to flush the tank system.
- Enter the estimated number of hours required to flush the tank system for every one gallon of flushing solution. If, for example, it will take 1 minute for every gallon of flushing solution to flush the tank system, enter a work rate of 0.017 (1 divided by 60) for flushing the tank and piping. If an estimate of the total number of hours required to flush the tank and piping has already been formulated, you may bypass this step and enter that number directly on line 7.

DECONTAMINATION SUMMARY SHEET - Page 1 of 1

Facility Name: 25,000 Gallons - Left In Place

D	DECONTAMINATION SUMMARY WORKSHEET					
	Cost (\$)					
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	TS-10A	4,214			
2.	Decontamination of Unit by Sandblasting	TS-10B				
3.	Decontamination of Heavy Equipment	TS-10C				
TOTA Work	\$4,214					

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	1,444.2	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
3	Labor and equipment cost per work hour ^b	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	39.0	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply I	\$2,630		
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²) ^d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	5,777	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$2,630		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter			
	from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	1,571.4	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	42.5	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply I			\$1,584
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²)d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	6,286	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$1,584		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: 25,000 Gallons - Left in Place

SAMPLING AND ANALYSIS SUMMARY WORKSHEET						
	Worksheet Activity Number Cost (\$)					
1.	Drilling and Subsurface Soil Sampling & Analysis	TS-11B				
2.	Concrete Core Sampling & Analysis	TS-11C	458			
3.	Wipe Sampling & Analysis	TS-11D	555			
4.	Surface Water/Liquid Sampling & Analysis	TS-11E	4,066			
5.	508					
TOTA on W	\$5,587					

SAMPLE INVENTORY - Page 1 of 2

The information entered on this inventory worksheet will be used in completing the appropriate worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES						
In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.						
1	Number of Subsurface Soil Samples					
	Boring Diameter:					
		boreholes	samples/borehole	total samples		
2 NUMBE	R OF CONCRETE CORE	SAMPLES				
		mber of concrete core sa s to be collected in the b	amples to be collected foox provided.	r each individual unit.		
2	Number of Concrete C	core Samples		1 total samples		
3 NUMBE	R OF WIPE SAMPLES					
	In the space below, identify the number of sample locations and the number of wipe samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.					
3	Number of Wipe Samples					
	locations samples/location 1 total samples					
4 NUMBER OF SURFACE WATER/LIQUID SAMPLES						
In the space below, identify the number of grab samples taken on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.						
4	Number of Aqueous Samples					
	locations samples/location 8 total samples					

SAMPLE INVENTORY - Page 2 of 2

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES						
In the space below, identify the number of grab samples taken of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.						
5 Number of Nonaqueous Samples						
		locations	samples/location	1	total samples	

CONCRETE CORE SAMPLING & ANALYSIS - Page 1 of 1

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1 COLL	1 COLLECTING CONCRETE CORE SAMPLES					
1.A	Number of concrete core samples to be collected (Enter from worksheet TS-11A, line 2)	1	core samples			
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE			
1.C	Labor and equipment cost per work hourb	\$				
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6-inches ^c		work hr/sample			
1.E	Number of hours required to drill 3-inch- diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	1	work hrs			
1.F	Cost to Collect Concrete Core Samples (Multip	\$41				
2 ANAI	LYZING CONCRETE CORE SAMPLES					
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	\$139	9 /event			
2.B	Enter the number of sampling events	3	events			
2.C Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)			\$417			
TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on worksheet TS-11, line 2)				\$458		

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.
- Enter the estimated number of work hours required to drill a 3-inch diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

WIPE SAMPLING & ANALYSIS - Page 1 of 1

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1 COLLECTING WIPE SAMPLES					
1.A	Number of wipe samples to be collected (Enter from worksheet TS-11A, line 3)	1	samples		
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE		
1.C	Labor and equipment cost per work hourb	\$			
1.D	Work rate required to collect one sample ^c		work hr/sample		
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0	work hrs		
1.F	1.F Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)			\$138	
2 ANALY	ZING WIPE SAMPLES				
2.A	Cost of analysis per sampling event for wipe samples (Enter from Page 2 of 2 of this worksheet)				
2.B	Number of sampling events				
2.C	2.C Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)			\$417	
_	. COST OF COLLECTION AND ANALYSIS OF W .F and 2.C) (Enter total on Worksheet TS-11, lin	\$555			

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.
- Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SURFACE WATER/LIQUID SAMPLING & ANALYSIS - Page 1 of 1

Surface water/liquid samples are grab samples taken from lakes, rivers, or ponds, and samples taken of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLECTING SURFACE WATER/LIQUID SAMPLES				
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet TS-11A, line 4)	8	samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a		level of PPE	
1.C	Labor and equipment cost per work hourb			
1.D	Work rate required to collect one sample ^c	wo	rk hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	8.0	work hrs	
1.F	Cost to Collect Surface Water/Liquid Samples line 1.E)	(Multiply line	e 1.C by	\$730
2 ANAI	YZING SURFACE WATER/LIQUID SAMPLES			
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	\$139	/event	
2.B	Number of sampling events	24	events	
2.C	2.C Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)			\$3,336
WAT	AL COST OF COLLECTION AND ANALYSIS OF SER/LIQUID SAMPLES (Add lines 1.F to line 2.C) sheet TS-11, line 4)	\$4,066		

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect surface water/liquid samples.
- Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SOIL/SLUDGE/SEDIMENT SAMPLING & ANALYSIS - Page 1 of 1

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

1 COL	ECTING SOIL/SLUDGE/SEDIMENT SAMPLES			
1.A	Number of soil/sludge/sediment samples to be collected (Enter from worksheet TS-11A, line 5)	1	samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
1.C	Labor and equipment cost per work hourb	\$		
1.D	Work rate required to collect one sample ^c		work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1	work hrs	
1.F	F Cost to Collect Soil/Sludge/Sediment Samples (Multiply line 1.C by line 1.E)			\$91
2 ANA	Lyzing soil/sludge/sediment samples			
2.A	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	\$13	9 /event	
2.B	Number of sampling events	3	events	
2.C	2.C Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)			\$417
SOIL	AL COST OF COLLECTION AND ANALYSIS OF /SLUDGE/SEDIMENT SAMPLES (Add lines 1.F at sheet TS-11, line 5)) (Enter total on	\$508	

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.
- Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

TRANSPORTATION OF WASTE - Page 1 of 1

Depending on the activities being conducted, it may not be necessary to complete all sections of the transportation worksheet.

1 TRAN	1 TRANSPORTATION OF WASTE IN DRUMS					
1.A	Number of drums of waste		drums			
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	\$	/truckload			
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)		truckloads			
1.D	Cost to Transport Waste In Drums (Multiply lin	e 1.B by li	ine 1.C)	\$		
2 TRAN	ISPORTATION OF BULK LIQUIDS					
2.A	Gallons of liquid waste	25,060	gal			
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	\$	/truckload			
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	4	truckloads			
2.D				\$4,350		
3 TRAN	ISPORTATION OF BULK WASTE					
3.A	Number of waste debris boxes		debris boxes			
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	\$	/truckload			
3.C	Cost to Transport Bulk Solid Waste (assume of hauled on each truck) (Multiply line 3.A by line	\$				
	AL COST TO TRANSPORT WASTE (Add lines 1. on Worksheet TS-1, line 10)	D, 2.D, and	d 3.C) (Enter	\$4,350		

TREATMENT AND DISPOSAL SUMMARY SHEET - Page 1 of 1

Facility Name: 25,000 Gallons - Left in Place

SUMMARY WORKSHEET				
	Activity	Worksheet Number	Cost (\$)	
1.	Treatment and Disposal of Waste	TS-13A		
2.	Transportation and Disposal of Decontamination Fluids	TS-13B	40,567	
TOTAL (Enter tot	\$40,567			

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 1 of 2

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. gal gal gal gal gal gal	37,123 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D level of PPE	
3	Labor and equipment cost per work hour ^b	\$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon) ^c	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	3 work hours	
6	Subtotal of labor and equipment cost to pum to a holding tank (multiply line 3 by line 5)	p decontamination fluid	\$128
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	\$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	4 tanks	
10	Subtotal of tank rental costs (Multiply lines 7	, 8, and 9)	\$1,460
11	Removal cost per gallon of bulk liquid ^d	\$ /gal	
12	Subtotal of removal cost for bulk liquids (Mul	tiply line 1 by line 11)	\$38,979
	TOTAL COST TO TRANSPORT AND DISPO DECONTAMINATION FLUID AS A BULK LIG and 12) (Enter total on Worksheet TS-13, I	QUID (Add lines 6, 10,	\$40,567

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.
- Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already bee formulated, you may bypass this step and enter that number directly on line 5.
- d Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure	1	
2	Cost of certification of closure per unitb	\$	
	\$3,640		

- ^a Facilities closing multiple tanks in the same manner at the same time should incur cost of certification of closure only once.
- ^a Determine the total number of samples to be analyzed at the time of closure. The number of QC samples
- by typically is estimated tain 20 des the formable of samples wind early likes by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK LEFT IN PLACE AT CLOSURE - CAPACITY 25,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 25,000 Gallons - Left in Place -Ignitable Waste

	SUMMARY WORKSHEET			
of closure might into effect clo	Activity the activities listed below are conducted routinely as part e of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of itional activities are listed in italic type.	Worksheet Number	Cost (\$)	
1.	Removal of Waste	TS-3	483	
2.	Tank System Purging (ignitible wastes only)	TS-4	585	
3.	Flushing the Tank and Piping	TS-5	966	
4.	Disassembly and Loading	TS-6		
5.	Demolition and Removal of Containment System	TS-7		
6.	Removal of Soil	TS-8		
7.	Backfill	TS-9		
8.	Decontamination	TS-10	4,214	
9.	Sampling and Analysis	TS-11	5,587	
10.	Transportation	TS-12	4,350	
11.	Treatment and Disposal	TS-13	40,567	
12.	Subtotal of Closure Costs (Add lines 1 through 11)		56,752	
13.				
14.	Certification of Closure	TS-14	3,640	
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			66,067	
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			13,213	
ТОТА	L COST OF CLOSURE (add lines 15 and 16)		\$79,280	

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	25,060	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	375.9	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply line	2 by line 3)	\$376
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	6.5	work hrs	
9	Labor cost to purge tank system (Multiply line	6 by line 8)		\$209
	AL COST OF TANK SYSTEM PURGING (Add line orksheet TS-1, line 2)	\$585		

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMATING WORKSHEETS FOR CLOSU	RE OF A TANK SYSTEM
TANK REMOVED AT CLOSURE - CAPACIT	Y 25,000 GALLONS

Facility Name: 25,000 Gallons - Removed at Closure

	SUMMARY WORKSHEET				
of closure might inte effect clo	Activity the activities listed below are conducted routinely as part e of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of tional activities are listed in italic type.	Worksheet Number	Cost (\$)		
1.	Removal of Waste	TS-3	483		
2.	Tank System Purging (ignitible wastes only)	TS-4			
3.	Flushing the Tank and Piping	TS-5	966		
4.	Disassembly and Loading	TS-6	3,434		
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	4,214		
9.	Sampling and Analysis	TS-11	5,587		
10.	Transportation	TS-12	4,350		
11.	Treatment and Disposal	TS-13	40,567		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		59,601		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	5,960		
14.	Certification of Closure	TS-14	3,640		
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			69,201		
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			13,840		
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$83,041		

DISASSEMBLY AND LOADING - Page 1 of 2

This worksheet can be used to determine the costs of disassembling and loading above ground or onground tanks and ancillary piping. $^{\rm a}$

שכום ו	SSEMBLY OF ANCILLARY PIPING			
1.A	Length of ancillary piping to be disassembled (Enter from worksheet TS-2, line 1.C)	346.6	ft	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	level of PPE	
1.C	Labor and equipment cost per work hour ^c	\$		
1.D	Work rate required to disassemble one ft of pipe ^d		work hr/ft	
1.E	Number of hours required to disassemble ancillary piping (Multiply line 1.A by line 1.D) (One hour minimum; round up to the halfhour)	52.0	work hrs	
1.F	Cost to Disassemble Ancillary Piping (Multiply	line 1.C b	y line 1.E)	\$2,310
2 LOAI	DING			
2.A	Capacity of tank (Enter from worksheet			
11	TS-2, line 1.B)	25,000	gal	
2.B	TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b	25,000 D	gal level of PPE	
2.B 2.C	Level of PPE assumed for this activity		-	
	Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	-	
2.C	Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon	D	level of PPE work hr/	
2.C 2.D	Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon capacity ^f Number of hours required to load tank (Multiply line 2.A by line 2.D) (One hour	D \$ 25.0	level of PPE work hr/ gal capacity	\$1,124

DISASSEMBLY AND LOADING - Page 2 of 2

- Owners and operators of in-ground and underground tank systems are not eligible to use standard permits.
- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to disassemble ancillary piping.
- d Enter the estimated number of work hours required to disassemble one foot of ancillary piping. If, for example, it will take 10 minutes to disassemble each foot of ancillary piping, enter a work rate of 0.167 (10 divided by 60) for disassembling the piping. If an estimate of the total number of hours required to disassemble the piping has already been formulated, you may bypass this step and enter that number directly on line 1.E.
- Enter the estimated cost per work hour of all labor and equipment needed to load components of the onground or aboveground tank system. In addition to costs for labor, this cost should include the average cost per work hour of rental of all equipment and purchase of all supplies needed to conduct this activity.
- Enter the estimated number of work hours per gallon of capacity required to load the components of the on-ground or aboveground tank system. If, for example, it will take 1 minute for every gallon of capacity to load components of the tank system, enter a work rate of 0.017 (1 divided by 60) for loading the system. If an estimate of the total number of hours required to load the tank system has already been formulated, you may bypass this step and enter that number directly on line 2.E.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK REMOVED AT CLOSURE - CAPACITY 25,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 25,000 Gallons - Removed at Closure -Ignitable Waste

	SUMMARY WORKSHEET				
of closure might inte effect clos	Activity the activities listed below are conducted routinely as part of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of tional activities are listed in italic type.	Worksheet Number	Cost (\$)		
1.	Removal of Waste	TS-3	483		
2.	Tank System Purging (ignitible wastes only)	TS-4	585		
3.	Flushing the Tank and Piping	TS-5	966		
4.	Disassembly and Loading	TS-6	3,434		
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	4,214		
9.	Sampling and Analysis	TS-11	5,587		
10.	Transportation	TS-12	4,350		
11.	Treatment and Disposal	TS-13	40,567		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		60,186		
13.					
14.	Certification of Closure	TS-14	3,640		
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			69,845		
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			13,969		
TOTAL	COST OF CLOSURE (add lines 15 and 16)		\$83,814		

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	25,060	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	375.9	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply line	e 2 by line 3)	\$376
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	6.5	work hrs	
9	Labor cost to purge tank system (Multiply line 6 by line 8)			\$209
	AL COST OF TANK SYSTEM PURGING (Add line orksheet TS-1, line 2)	\$585		

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMATING WORKSHEETS FOR CLOSURE TANK LEFT IN PLACE AT CLOSURE - CAPACIT	OF A TANK SYSTEM Y 30,000 GALLONS

Facility Name: 30,000 Gallons - Left in Place

	SUMMARY WORKSHEET				
of closure might into effect clo	Activity Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number				
1.	Removal of Waste	TS-3	590		
2.	Tank System Purging (ignitible wastes only)	TS-4			
3.	Flushing the Tank and Piping	TS-5	1,127		
4.	Disassembly and Loading	TS-6			
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	4,902		
9.	Sampling and Analysis	TS-11	6,513		
10.	Transportation	TS-12	5,438		
11.	Treatment and Disposal	TS-13	48,356		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		66,926		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	6,693		
14.	Certification of Closure	TS-14	3,640		
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			77,259		
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			15,452		
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$92,711		

INVENTORY - Page 1 of 2

The information entered in this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the cost of closure for tank systems. If the design characteristics of the tank system to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures, soils, and materials to be removed. Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete all sections of this inventory worksheet.

<u> </u>							
1 UNIT D	1 UNIT DESCRIPTION AND MAXIMUM PERMITTED CAPACITY						
Describ	be the unit to determine the cost of the active	vities to be cor	nducted to	close it.			
1.A	Type of tank system (aboveground or on-ground) ^b						
1.B	Maximum permitted capacity of tank	30,000	gal				
1.C	Total length of ancillary piping	415.9	ft				
1.D	Maximum capacity of ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the capacity of ancillary piping)	72	gal				
1.E	Maximum capacity of tank and ancillary piping (Add lines 1.B and 1.C)	30,072	gal				
1.F	1.F Type of secondary containment system Double-wall tank Vault Lined containmen Other (explain)			t system (exte	rnal to tank)		
2 INTERI	OR SURFACE AREA OF TANK SYSTEM						
Determ	nine the interior surface area of the tank sys	tem to determi	ne costs of	decontaminat	ion.		
2.A	Interior surface area of tank (Refer to Page 4 of 5 of this worksheet for guidance on estimating the interior surface area of a tank.)	1,415.0	ft²				
2.B	Ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the interior surface area of ancillary piping.)	224.6	ft²				
2.C	Surface Area of Tank System (Add lines	2.A and 2.B)		1,639.6	ft²		
2.D	Surface Area of Tank System in yd² (Divide line 2.C by 9)			182.2	yd²		

INVENTORY - Page 2 of 2

3 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Determine the surface area of the secondary containment system pad to calculate costs for decontaminating and demolishing the pad. Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure.

3.A	Length	ft		
3.B	Width	ft		
3.C	3.C Surface Area of Secondary Containment System Pad (Multiply line 3.A by line 3.B)			ft²
3.D	Surface Area of Secondary Containment (Divide line 3.C by 9)	209.5	yd²	

4 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Calculate the volume of the secondary containment system pad to determine the cost of removing the pad. Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure.

4.A	Thickness	ft	
4.B	Thickness in yards (Divide line 4.A by 3)	yd	
4.C	Volume of Secondary Containment Syste line 3.D by line 4.B)	m Pad in yd³ (Multiply	yd³

5 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM BERM

Calculate the interior surface area of the secondary containment system berm, or curbing, to determine the cost of decontaminating and demolishing the berm. Demolition of the secondary containment system berm is an additional activity that might be conducted if the owner or operator intends to demolish the berm at the time of closure.

5.A	Length	ft	
5.B	Height	ft	
5.C	Surface Area of Secondary Containment line 5.A by line 5.B)	ft²	
5.D	Surface Area of Secondary Containment (Divide line 5.C by 9)	yd²	

- For example, if a secondary containment system pad is circular in shape rather than rectangular, the user would be unable to calculate the surface area of that pad using the method prescribed in section 2 of this inventory worksheet. Rather, the surface area of such a pad could be calculated using the equation πr^2 .
- Owners and operators of in-ground and underground storage tanks are not eligible to use standardized permits.

REMOVAL OF WASTE - Page 1 of 1

1	Maximum volume of waste to be removed from the tank and ancillary piping (Enter from worksheet TS-2, line 1.E)	30,072	gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hour ^b	\$		
4	Work rate required to remove waste from tank and ancillary piping ^c		work hr/gal	
5	Number of hours required to remove waste from tank and ancillary piping (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	5.5	work hrs	
	L COST OF REMOVAL OF WASTE FROM TANK G (Multiply line 3 by line 5) (Enter total on Works	\$590		

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to remove waste from the unit.
- Enter the estimated number of hours required to remove one gallon of waste from the tank system. If, for example, it will take 1 minute to remove each gallon of waste from the system, enter a work rate of 0.017 (1 divided by 60) for removing the waste. If an estimate of the total number of hours required to remove waste from the tank and ancillary piping has already been formulated, you may bypass this step and enter that number directly on line 5.

FLUSHING THE TANK AND PIPING - Page 1 of 2

1	Maximum capacity of the tank and ancillary piping (Enter from Worksheet TS-2, line 1.E)	30,072	gal	
2	Number of times tank and ancillary piping will be flushed (if unknown, assume 1)	1		
3	Total volume of flushing solution (Multiply line 1 by line 2)	30,072	gal	
4	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
5	Labor and equipment cost per work hour ^b	\$		
6	Work rate required to flush tank and ancillary piping ^c		work hr/gal	
7	Number of hours required to flush tank and ancillary piping (Multiply line 3 by line 6) (One hour minimum; round up to the halfhour)	10.5	work hrs	
8	Subtotal of labor and equipment costs to flush piping (Multiply line 5 by line 7)	•		\$1,127
9	Total volume of flushing solution (Enter from line 3). (The flushing solution generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B (for water-based flushing solution) or TS-12 and TS-13A (for a solvent solution) to calculate the transportation, treatment, and disposal cost. If the flushing solution is to be placed in drums, complete lines 10 through 12.)	30,072	gal	
10	Number of drums required to contain flushing solution (Divide line 9 by 55 gallons per drum; round up to the nearest whole number)		drums	
11	Cost of one drum	\$	/drum	
12	Cost of drums needed to contain flushing solution 11)	\$0		
	L COST OF FLUSHING OF TANK AND ANCILLAR 2) (Enter total on Worksheet TS-1, line 3)	RY PIPING	(Add lines 8	\$1,127

Remember to calculate costs for transporting, treating, and disposing of the wastes in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If the wastes are to be managed as a bulk liquid, use worksheet TS-13B.

FLUSHING THE TANK AND PIPING - Page 2 of 2

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to flush the tank system.
- Enter the estimated number of hours required to flush the tank system for every one gallon of flushing solution. If, for example, it will take 1 minute for every gallon of flushing solution to flush the tank system, enter a work rate of 0.017 (1 divided by 60) for flushing the tank and piping. If an estimate of the total number of hours required to flush the tank and piping has already been formulated, you may bypass this step and enter that number directly on line 7.

DECONTAMINATION SUMMARY SHEET - Page 1 of 1

Facility Name: 30,000 Gallons - Left In Place

D	DECONTAMINATION SUMMARY WORKSHEET				
	Activity	Worksheet Number	Cost (\$)		
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	TS-10A	4,902		
2.	Decontamination of Unit by Sandblasting	TS-10B			
3.	Decontamination of Heavy Equipment	TS-10C			
TOTA Work	\$4,902				

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	1,639.6	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	44.5	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply li			\$3,001
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²)d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	6,558	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamina 8 by line 9)	\$		
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$3,001		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C,	4 005 (612	
2	5.C, and 7.A) Level of PPE assumed for this activity (protection level D, C, or B) ^a	1,885.6 D	ft ² level of PPE	
3	Labor and equipment cost per work hour ^b	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft ²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	51.0	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply I			\$1,901
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²) ^d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	7,542	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$1,901		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: 30,000 Gallons - Left in Place

SAMPLING AND ANALYSIS SUMMARY WORKSHEET					
	Cost (\$)				
1.	Drilling and Subsurface Soil Sampling & Analysis	TS-11B			
2.	Concrete Core Sampling & Analysis	TS-11C	458		
3.	Wipe Sampling & Analysis	TS-11D	972		
4.	Surface Water/Liquid Sampling & Analysis	TS-11E	4,575		
5.	508				
TOTA on W	\$6,513				

SAMPLE INVENTORY - Page 1 of 2

The information entered on this inventory worksheet will be used in completing the appropriate worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES						
In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.						
1	Number of Subsurface Soil Samples					
	Boring Diameter:					
		boreholes	samples/borehole	total samples		
2 NUMBEI	R OF CONCRETE CORE	SAMPLES				
		mber of concrete core so s to be collected in the b	amples to be collected fo	r each individual unit.		
2	Number of Concrete C	Core Samples		1 total samples		
3 NUMBEI	R OF WIPE SAMPLES					
			s and the number of wip umber of samples to be c			
3	Number of Wipe Samples					
	locations samples/location 2 total samples					
4 NUMBER OF SURFACE WATER/LIQUID SAMPLES						
In the space below, identify the number of grab samples taken on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.						
4	Number of Aqueous Samples					
	locations samples/location 9 total samples					

SAMPLE INVENTORY - Page 2 of 2

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES						
In the space below, identify the number of grab samples taken of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.						
5 Number of Nonaqueous Samples						
		locations	samples/location	1	total samples	

CONCRETE CORE SAMPLING & ANALYSIS - Page 1 of 1

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1 COLL	1 COLLECTING CONCRETE CORE SAMPLES					
1.A	Number of concrete core samples to be collected (Enter from worksheet TS-11A, line 2)	1	core samples			
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE			
1.C	Labor and equipment cost per work hourb	\$				
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6-inches ^c		work hr/sample			
1.E	Number of hours required to drill 3-inch- diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	1	work hrs			
1.F	Cost to Collect Concrete Core Samples (Multip	1.C by line 1.E)	\$41			
2 ANAI	LYZING CONCRETE CORE SAMPLES					
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	\$139	9 /event			
2.B	Enter the number of sampling events	3	events			
2.C	2.C Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)			\$417		
TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on worksheet TS-11, line 2)				\$458		

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.
- Enter the estimated number of work hours required to drill a 3-inch diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

WIPE SAMPLING & ANALYSIS - Page 1 of 1

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1 COLLECTING WIPE SAMPLES					
1.A	Number of wipe samples to be collected (Enter from worksheet TS-11A, line 3)	2	samples		
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE		
1.C	Labor and equipment cost per work hourb	\$			
1.D	Work rate required to collect one sample ^c		work hr/sample		
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0	work hrs		
1.F	1.F Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)			\$138	
2 ANALY	ZING WIPE SAMPLES				
2.A	Cost of analysis per sampling event for wipe samples (Enter from Page 2 of 2 of this worksheet)				
2.B	Number of sampling events	6	events		
2.C	2.C Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)			\$834	
_	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet TS-11, line 3)			\$972	

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.
- Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SURFACE WATER/LIQUID SAMPLING & ANALYSIS - Page 1 of 1

Surface water/liquid samples are grab samples taken from lakes, rivers, or ponds, and samples taken of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLECTING SURFACE WATER/LIQUID SAMPLES					
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet TS-11A, line 4)	9	samples		
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	leve	of PPE		
1.C	Labor and equipment cost per work hourb				
1.D	Work rate required to collect one sample ^c	work hr	/sample		
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	9.0 w	ork hrs		
1.F	Cost to Collect Surface Water/Liquid Samples line 1.E)	\$822			
2 ANAI	YZING SURFACE WATER/LIQUID SAMPLES				
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	\$139	/event		
2.B	Number of sampling events				
2.C	Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)			\$3,753	
WAT	AL COST OF COLLECTION AND ANALYSIS OF SER/LIQUID SAMPLES (Add lines 1.F to line 2.C) sheet TS-11, line 4)	\$4,575			

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect surface water/liquid samples.
- Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SOIL/SLUDGE/SEDIMENT SAMPLING & ANALYSIS - Page 1 of 1

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

1 COL	ECTING SOIL/SLUDGE/SEDIMENT SAMPLES			
1.A	Number of soil/sludge/sediment samples to be collected (Enter from worksheet TS-11A, line 5)	1	samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
1.C	Labor and equipment cost per work hourb	\$		
1.D	Work rate required to collect one sample ^c		work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1	work hrs	
1.F	Cost to Collect Soil/Sludge/Sediment Samples line 1.E)	(Multi	ply line 1.C by	\$91
2 ANA	Lyzing soil/sludge/sediment samples			
2.A	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	\$13	9 /event	
2.B	Number of sampling events	3	events	
2.C	2.C Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)			\$417
SOIL	AL COST OF COLLECTION AND ANALYSIS OF /SLUDGE/SEDIMENT SAMPLES (Add lines 1.F at sheet TS-11, line 5)) (Enter total on	\$508	

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.
- Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

TRANSPORTATION OF WASTE - Page 1 of 1

Depending on the activities being conducted, it may not be necessary to complete all sections of the transportation worksheet.

1 TRAN	ISPORTATION OF WASTE IN DRUMS			
1.A	Number of drums of waste		drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)		truckloads	
1.D	Cost to Transport Waste In Drums (Multiply lin	e 1.B by lir	ne 1.C)	\$
2 TRAN	ISPORTATION OF BULK LIQUIDS			
2.A	Gallons of liquid waste	30,072	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	5	truckloads	
2.D	Cost to Transport Bulk Liquid Waste (Multiply	line 2.B by	line 2.C)	\$5,438
3 TRAN	ISPORTATION OF BULK WASTE			
3.A	Number of waste debris boxes		debris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
3.C	Cost to Transport Bulk Solid Waste (assume of hauled on each truck) (Multiply line 3.A by line	\$		
	AL COST TO TRANSPORT WASTE (Add lines 1.1 on Worksheet TS-1, line 10)	D, 2.D, and	I 3.C) (Enter	\$5,438

TREATMENT AND DISPOSAL SUMMARY SHEET - Page 1 of 1

Facility Name: 30,000 Gallons - Left in Place

SUMMARY WORKSHEET					
	Activity	Worksheet Number	Cost (\$)		
1.	Treatment and Disposal of Waste	TS-13A			
2.	Transportation and Disposal of Decontamination Fluids	TS-13B	48,356		
	TOTAL COST OF TREATMENT AND DISPOSAL (Add lines 1 and 2) (Enter total on Worksheet TS-1, line 11) \$48,356				

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 1 of 2

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. gal gal gal gal gal gal	44,172 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D level of PPE	
3	Labor and equipment cost per work hour ^b	\$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon) ^c	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	3 work hours	
6	Subtotal of labor and equipment cost to pum to a holding tank (multiply line 3 by line 5)	p decontamination fluid	\$150
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	\$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	5 tanks	
10	Subtotal of tank rental costs (Multiply lines 7	, 8, and 9)	\$1,825
11	Removal cost per gallon of bulk liquid ^d	\$ /gal	
12	Subtotal of removal cost for bulk liquids (Mul	tiply line 1 by line 11)	\$46,381
	TOTAL COST TO TRANSPORT AND DISPO DECONTAMINATION FLUID AS A BULK LIG and 12) (Enter total on Worksheet TS-13, I	QUID (Add lines 6, 10,	\$48,356

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.
- Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already bee formulated, you may bypass this step and enter that number directly on line 5.
- d Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure	1	
2	Cost of certification of closure per unitb	\$	
	\$3,640		

- ^a Facilities closing multiple tanks in the same manner at the same time should incur cost of certification of closure only once.
- ^a Determine the total number of samples to be analyzed at the time of closure. The number of QC samples
- by typically is estimated tain 20 des the formable of samples wind early likes by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK LEFT IN PLACE AT CLOSURE - CAPACITY 30,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 30,000 Gallons - Left in Place -Ignitable Waste

	SUMMARY WORKSHEET				
of closure might into effect clo	Activity the activities listed below are conducted routinely as part e of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of tional activities are listed in italic type.	Worksheet Number	Cost (\$)		
1.	Removal of Waste	TS-3	590		
2.	Tank System Purging (ignitible wastes only)	TS-4	692		
3.	Flushing the Tank and Piping	TS-5	1,127		
4.	Disassembly and Loading	TS-6			
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	4,902		
9.	Sampling and Analysis	TS-11	6,513		
10.	Transportation	TS-12	5,438		
11.	Treatment and Disposal	TS-13	48,356		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		67,618		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	6,762		
14.	Certification of Closure	TS-14	3,640		
15.	on of closure to	78,020			
16.	Contingency Allowance (approximately 20% of closure continuous and cost of certification of closure) (Multiply line)	osts, engineering ne 15 by 0.20)	15,604		
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$93,624		

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	30,072	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	451.1	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply line	e 2 by line 3)	\$451
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	7.5	work hrs	
9	Labor cost to purge tank system (Multiply line	6 by line 8)	\$241
	AL COST OF TANK SYSTEM PURGING (Add line forksheet TS-1, line 2)	\$692		

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMA	TING WORKSHEET	S FOR CLOSURE O	OF A TANK SYSTEM
TANK RE	EMOVED AT CLOSU	JRE - CAPACITY 30	0,000 GALLONS

Facility Name: 30,000 Gallons - Removed at Closure

	SUMMARY WORKSHEET				
of closure might into effect clo	Activity the activities listed below are conducted routinely as part e of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of tional activities are listed in italic type.	Worksheet Number	Cost (\$)		
1.	Removal of Waste	TS-3	590		
2.	Tank System Purging (ignitible wastes only)	TS-4			
3.	Flushing the Tank and Piping	TS-5	1,127		
4.	Disassembly and Loading	TS-6	4,125		
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	4,902		
9.	Sampling and Analysis	TS-11	6,513		
10.	Transportation	TS-12	5,438		
11.	Treatment and Disposal	TS-13	48,356		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		71,051		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	7,105		
14.	Certification of Closure	TS-14	3,640		
15.	on of closure to	81,796			
closure costs) (Add lines 12, 13, and 14) 16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			16,359		
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$98,155		

DISASSEMBLY AND LOADING - Page 1 of 2

This worksheet can be used to determine the costs of disassembling and loading above ground or onground tanks and ancillary piping. $^{\rm a}$

1 DISA	SSEMBLY OF ANCILLARY PIPING			
1.A	Length of ancillary piping to be disassembled (Enter from worksheet TS-2, line 1.C)	415.9	ft	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	level of PPE	
1.C	Labor and equipment cost per work hour ^c	\$		
1.D	Work rate required to disassemble one ft of pipe ^d		work hr/ft	
1.E	Number of hours required to disassemble ancillary piping (Multiply line 1.A by line 1.D) (One hour minimum; round up to the halfhour)	62.5	work hrs	
1.F	Cost to Disassemble Ancillary Piping (Multiply	line 1.C b	y line 1.E)	\$2,777
2 LOAD	DING			
2.A	Capacity of tank (Enter from worksheet TS-2, line 1.B)	30,000	gal	
2.A 2.B		30,000 D	gal level of PPE	
	TS-2, line 1.B) Level of PPE assumed for this activity		-	
2.B	TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	-	
2.B 2.C	TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon	D	level of PPE work hr/	
2.B 2.C 2.D	TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon capacity ^f Number of hours required to load tank (Multiply line 2.A by line 2.D) (One hour	D \$	level of PPE work hr/ gal capacity	\$1,348

DISASSEMBLY AND LOADING - Page 2 of 2

- Owners and operators of in-ground and underground tank systems are not eligible to use standard permits.
- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to disassemble ancillary piping.
- d Enter the estimated number of work hours required to disassemble one foot of ancillary piping. If, for example, it will take 10 minutes to disassemble each foot of ancillary piping, enter a work rate of 0.167 (10 divided by 60) for disassembling the piping. If an estimate of the total number of hours required to disassemble the piping has already been formulated, you may bypass this step and enter that number directly on line 1.E.
- Enter the estimated cost per work hour of all labor and equipment needed to load components of the onground or aboveground tank system. In addition to costs for labor, this cost should include the average cost per work hour of rental of all equipment and purchase of all supplies needed to conduct this activity.
- Enter the estimated number of work hours per gallon of capacity required to load the components of the on-ground or aboveground tank system. If, for example, it will take 1 minute for every gallon of capacity to load components of the tank system, enter a work rate of 0.017 (1 divided by 60) for loading the system. If an estimate of the total number of hours required to load the tank system has already been formulated, you may bypass this step and enter that number directly on line 2.E.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK REMOVED AT CLOSURE - CAPACITY 30,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 30,000 Gallons - Removed at Closure -Ignitable Waste

	SUMMARY WORKSHEET				
of closure might inte effect clo	Activity the activities listed below are conducted routinely as part of tank systems. The owner or operator, however, and or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of tional activities are listed in italic type.	Worksheet Number	Cost (\$)		
1.	Removal of Waste	TS-3	590		
2.	Tank System Purging (ignitible wastes only)	TS-4	692		
3.	Flushing the Tank and Piping	TS-5	1,127		
4.	Disassembly and Loading	TS-6	4,125		
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	4,902		
9.	Sampling and Analysis	TS-11	6,513		
10.	Transportation	TS-12	5,438		
11.	Treatment and Disposal	TS-13	48,356		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		71,743		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	7,174		
14.	Certification of Closure	TS-14	3,640		
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			82,557		
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			16,511		
TOTAL	COST OF CLOSURE (add lines 15 and 16)		\$99,068		

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	30,072	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	451.1	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply line	e 2 by line 3)	\$451
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	7.5	work hrs	
9	Labor cost to purge tank system (Multiply line	6 by line 8)	\$241
	AL COST OF TANK SYSTEM PURGING (Add line forksheet TS-1, line 2)	\$692		

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK LEFT IN PLACE AT CLOSURE - CAPACITY 35,000 GALLONS

Facility Name: 35,000 Gallons - Left in Place

	SUMMARY WORKSHEET				
of closure might into effect clo	Activity the activities listed below are conducted routinely as part e of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of tional activities are listed in italic type.	Worksheet Number	Cost (\$)		
1.	Removal of Waste	TS-3	644		
2.	Tank System Purging (ignitible wastes only)	TS-4			
3.	Flushing the Tank and Piping	TS-5	1,288		
4.	Disassembly and Loading	TS-6			
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	5,556		
9.	Sampling and Analysis	TS-11	7,529		
10.	Transportation	TS-12	6,525		
11.	Treatment and Disposal	TS-13	56,071		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		77,613		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	7,761		
14.	Certification of Closure	TS-14	3,640		
15.	89,014				
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			17,803		
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$106,817		

INVENTORY - Page 1 of 2

The information entered in this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the cost of closure for tank systems. If the design characteristics of the tank system to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures, soils, and materials to be removed. Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete all sections of this inventory worksheet.

1	UNIT DE	SCRIPTION AND MAXIMUM PERMITTED	CAPACITY			
	Describe	e the unit to determine the cost of the active	vities to be c	onducted to	close it.	
	1.A	Type of tank system (aboveground or on-ground) ^b				
	1.B	Maximum permitted capacity of tank	35,000	gal		
	1.C	Total length of ancillary piping	485.2	ft		
	1.D	Maximum capacity of ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the capacity of ancillary piping)	84	gal		
	1.E	Maximum capacity of tank and ancillary piping (Add lines 1.B and 1.C)	35,084	gal		
	1.F	Type of secondary containment system	Vault Lined		t system (externa	ıl to tank)
2	INTERIO	R SURFACE AREA OF TANK SYSTEM				
		ne the interior surface area of the tank sys	tam to datarr	mine costs of	decontamination	
			terri to deterr	Tillie Costs of	decontamination	
	2.A	Interior surface area of tank (Refer to Page 4 of 5 of this worksheet for guidance on estimating the interior surface area of a tank.)	1,555.0	ft²		
	2.B	Ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the interior surface area of ancillary piping.)	262.0	ft²		
	2.C	Surface Area of Tank System (Add lines	1	1,817.0	ft²	
	2.D Surface Area of Tank System in yd² (Divide line 2.C by 9)				201.9	yd²

INVENTORY - Page 2 of 2

3 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Determine the surface area of the secondary containment system pad to calculate costs for decontaminating and demolishing the pad. Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure.

3.A	Length	ft		
3.B	Width	ft		
3.C	3.C Surface Area of Secondary Containment System Pad (Multiply line 3.A by line 3.B)			ft²
3.D				yd²

4 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Calculate the volume of the secondary containment system pad to determine the cost of removing the pad. Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure.

4.A	Thickness	ft	
4.B	Thickness in yards (Divide line 4.A by 3)	yd	
4.C	Volume of Secondary Containment Syste line 3.D by line 4.B)	m Pad in yd³ (Multiply	yd³

5 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM BERM

Calculate the interior surface area of the secondary containment system berm, or curbing, to determine the cost of decontaminating and demolishing the berm. Demolition of the secondary containment system berm is an additional activity that might be conducted if the owner or operator intends to demolish the berm at the time of closure.

5.A	Length	ft	
5.B	Height	ft	
5.C	Surface Area of Secondary Containment line 5.A by line 5.B)	ft²	
5.D	Surface Area of Secondary Containment (Divide line 5.C by 9)	yd²	

- For example, if a secondary containment system pad is circular in shape rather than rectangular, the user would be unable to calculate the surface area of that pad using the method prescribed in section 2 of this inventory worksheet. Rather, the surface area of such a pad could be calculated using the equation πr^2 .
- Owners and operators of in-ground and underground storage tanks are not eligible to use standardized permits.

REMOVAL OF WASTE - Page 1 of 1

1	Maximum volume of waste to be removed from the tank and ancillary piping (Enter from worksheet TS-2, line 1.E)	35,084	gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate required to remove waste from tank and ancillary piping ^c		work hr/gal	
5	Number of hours required to remove waste from tank and ancillary piping (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	6.0	work hrs	
	L COST OF REMOVAL OF WASTE FROM TANK 6 (Multiply line 3 by line 5) (Enter total on Works	\$644		

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to remove waste from the unit.
- Enter the estimated number of hours required to remove one gallon of waste from the tank system. If, for example, it will take 1 minute to remove each gallon of waste from the system, enter a work rate of 0.017 (1 divided by 60) for removing the waste. If an estimate of the total number of hours required to remove waste from the tank and ancillary piping has already been formulated, you may bypass this step and enter that number directly on line 5.

FLUSHING THE TANK AND PIPING - Page 1 of 2

1	Maximum capacity of the tank and ancillary piping (Enter from Worksheet TS-2, line 1.E)	35,084	gal	
2	Number of times tank and ancillary piping will be flushed (if unknown, assume 1)	1		
3	Total volume of flushing solution (Multiply line 1 by line 2)	35,084	gal	
4	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
5	Labor and equipment cost per work hour ^b	\$		
6	Work rate required to flush tank and ancillary piping ^c		work hr/gal	
7	Number of hours required to flush tank and ancillary piping (Multiply line 3 by line 6) (One hour minimum; round up to the halfhour)	12.0	work hrs	
8	Subtotal of labor and equipment costs to flush piping (Multiply line 5 by line 7)			\$1,288
9	Total volume of flushing solution (Enter from line 3). (The flushing solution generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B (for water-based flushing solution) or TS-12 and TS-13A (for a solvent solution) to calculate the transportation, treatment, and disposal cost. If the flushing solution is to be placed in drums, complete lines 10 through 12.)	35,084	gal	
10	Number of drums required to contain flushing solution (Divide line 9 by 55 gallons per drum; round up to the nearest whole number)		drums	
11	Cost of one drum	\$	/drum	
12	Cost of drums needed to contain flushing solution 11)	\$0		
	L COST OF FLUSHING OF TANK AND ANCILLAR 2) (Enter total on Worksheet TS-1, line 3)	ry Piping	(Add lines 8	\$1,288

Remember to calculate costs for transporting, treating, and disposing of the wastes in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If the wastes are to be managed as a bulk liquid, use worksheet TS-13B.

FLUSHING THE TANK AND PIPING - Page 2 of 2

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to flush the tank system.
- Enter the estimated number of hours required to flush the tank system for every one gallon of flushing solution. If, for example, it will take 1 minute for every gallon of flushing solution to flush the tank system, enter a work rate of 0.017 (1 divided by 60) for flushing the tank and piping. If an estimate of the total number of hours required to flush the tank and piping has already been formulated, you may bypass this step and enter that number directly on line 7.

DECONTAMINATION SUMMARY SHEET - Page 1 of 1

Facility Name: 35,000 Gallons - Left In Place

D	DECONTAMINATION SUMMARY WORKSHEET					
	Activity	Worksheet Number	Cost (\$)			
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	TS-10A	5,556			
2.	Decontamination of Unit by Sandblasting	TS-10B				
3.	Decontamination of Heavy Equipment	TS-10C				
TOTA Work	\$5,556					

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	1,817.0	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
3	Labor and equipment cost per work hour ^b	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft ²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	49.5	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply I			\$3,338
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²) ^d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	7,268	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$3,338		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	2,199.9	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	59.5	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply I			\$2,218
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²)d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	8,800	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamina 8 by line 9)	\$		
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$2,218		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: 35,000 Gallons - Left in Place

SAMPLING AND ANALYSIS SUMMARY WORKSHEET					
	Worksheet Activity Number Cost (\$)				
1.	Drilling and Subsurface Soil Sampling & Analysis	TS-11B			
2.	Concrete Core Sampling & Analysis	TS-11C	458		
3.	Wipe Sampling & Analysis	TS-11D	972		
4.	Surface Water/Liquid Sampling & Analysis	TS-11E	5,591		
5.	Soil/Sludge/Sediment Sampling & Analysis	TS-11F	508		
TOTA on W	\$7,529				

SAMPLE INVENTORY - Page 1 of 2

The information entered on this inventory worksheet will be used in completing the appropriate worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES						
In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.						
1	Number of Subsurface Soil Samples					
	Boring Diameter:					
		boreholes	samples/borehole	total samples		
2 NUMBEI	R OF CONCRETE CORE	SAMPLES				
		mber of concrete core sa s to be collected in the b	amples to be collected foox provided.	r each individual unit.		
2	Number of Concrete C	Core Samples		1 total samples		
3 NUMBEI	R OF WIPE SAMPLES					
			s and the number of wip Imber of samples to be c			
3	Number of Wipe Samples					
	locations samples/location 2 total samples					
4 NUMBER OF SURFACE WATER/LIQUID SAMPLES						
In the space below, identify the number of grab samples taken on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.						
4	Number of Aqueous Samples					
		locations	samples/location	11 total samples		

SAMPLE INVENTORY - Page 2 of 2

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES					
In the space below, identify the number of grab samples taken of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.					
5 Number of Nonaqueous Samples					
		locations	samples/location	1	total samples

CONCRETE CORE SAMPLING & ANALYSIS - Page 1 of 1

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1 COLLECTING CONCRETE CORE SAMPLES				
1.A	Number of concrete core samples to be collected (Enter from worksheet TS-11A, line 2)	1	core samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
1.C	Labor and equipment cost per work hourb	\$		
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6-inches ^c		work hr/sample	
1.E	Number of hours required to drill 3-inch- diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	1	work hrs	
1.F Cost to Collect Concrete Core Samples (Multiply line 1.C by line 1.E)			\$41	
2 ANAI	LYZING CONCRETE CORE SAMPLES			
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	\$139	9 /event	
2.B	Enter the number of sampling events	3	events	
2.C Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)			\$417	
TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on worksheet TS-11, line 2)			\$458	

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.
- Enter the estimated number of work hours required to drill a 3-inch diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

WIPE SAMPLING & ANALYSIS - Page 1 of 1

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1 COLLECTING WIPE SAMPLES				
1.A	Number of wipe samples to be collected (Enter from worksheet TS-11A, line 3)	2	samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
1.C	Labor and equipment cost per work hourb	\$		
1.D	Work rate required to collect one sample ^c		work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0	work hrs	
1.F	1.F Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)			\$138
2 ANALY	ZING WIPE SAMPLES			
2.A	Cost of analysis per sampling event for wipe samples (Enter from Page 2 of 2 of this worksheet)	\$139) /event	
2.B	Number of sampling events	6	events	
2.C	2.C Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)			\$834
_	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet TS-11, line 3)			\$972

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.
- Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SURFACE WATER/LIQUID SAMPLING & ANALYSIS - Page 1 of 1

Surface water/liquid samples are grab samples taken from lakes, rivers, or ponds, and samples taken of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLE	1 COLLECTING SURFACE WATER/LIQUID SAMPLES				
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet TS-11A, line 4)	11	samples		
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a		level of PPE		
1.C	Labor and equipment cost per work hourb				
1.D	Work rate required to collect one sample ^c	W	ork hr/sample		
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	11.0	work hrs		
1.F	1.F Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)			\$1,004	
2 ANAI	YZING SURFACE WATER/LIQUID SAMPLES				
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	\$139	/event		
2.B	Number of sampling events	33	events		
2.C	2.C Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)			\$4,587	
WAT	TOTAL COST OF COLLECTION AND ANALYSIS OF SURFACE WATER/LIQUID SAMPLES (Add lines 1.F to line 2.C) (Enter total on Worksheet TS-11, line 4)			\$5,591	

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect surface water/liquid samples.
- Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SOIL/SLUDGE/SEDIMENT SAMPLING & ANALYSIS - Page 1 of 1

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

1 COL	1 COLLECTING SOIL/SLUDGE/SEDIMENT SAMPLES				
1.A	Number of soil/sludge/sediment samples to be collected (Enter from worksheet TS-11A, line 5)	1	samples		
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE		
1.C	Labor and equipment cost per work hourb	\$			
1.D	Work rate required to collect one sample ^c		work hr/sample		
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1	work hrs		
1.F	1.F Cost to Collect Soil/Sludge/Sediment Samples (Multiply line 1.C by line 1.E)			\$91	
2 ANA	2 ANALYZING SOIL/SLUDGE/SEDIMENT SAMPLES				
2.A	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	\$13	9 /event		
2.B	Number of sampling events	3	events		
2.C	2.C Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)			\$417	
SOIL	TOTAL COST OF COLLECTION AND ANALYSIS OF SOIL/SLUDGE/SEDIMENT SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet TS-11, line 5)			\$508	

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.
- Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

TRANSPORTATION OF WASTE - Page 1 of 1

Depending on the activities being conducted, it may not be necessary to complete all sections of the transportation worksheet.

1 TRAN	ISPORTATION OF WASTE IN DRUMS			
1.A	Number of drums of waste		drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)		truckloads	
1.D	Cost to Transport Waste In Drums (Multiply lin	e 1.B by li	ine 1.C)	\$
2 TRAN	ISPORTATION OF BULK LIQUIDS			
2.A	Gallons of liquid waste	35,084	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	6	truckloads	
2.D	Cost to Transport Bulk Liquid Waste (Multiply	line 2.B by	/ line 2.C)	\$6,525
3 TRAN	ISPORTATION OF BULK WASTE			
3.A	Number of waste debris boxes		debris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
3.C	Cost to Transport Bulk Solid Waste (assume of hauled on each truck) (Multiply line 3.A by line	ne debris b 3.B)	oox can be	\$
	AL COST TO TRANSPORT WASTE (Add lines 1. on Worksheet TS-1, line 10)	D, 2.D, an	d 3.C) (Enter	\$6,525

TREATMENT AND DISPOSAL SUMMARY SHEET - Page 1 of 1

Facility Name: 35,000 Gallons - Left in Place

SUMMARY WORKSHEET					
	Activity	Worksheet Number	Cost (\$)		
1.	Treatment and Disposal of Waste	TS-13A			
2.	Transportation and Disposal of Decontamination Fluids	TS-13B	56,071		
TOTAL (Enter tot	\$56,071				

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 1 of 2

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. gal gal gal gal gal	51,152 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D level of PPE	
3	Labor and equipment cost per work hourb	\$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon) ^c	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	4 work hours	
6	Subtotal of labor and equipment cost to pum to a holding tank (multiply line 3 by line 5)	p decontamination fluid	\$171
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	\$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	6 tanks	
10	Subtotal of tank rental costs (Multiply lines 7	, 8, and 9)	\$2,190
11	Removal cost per gallon of bulk liquid ^d	\$ /gal	
12	Subtotal of removal cost for bulk liquids (Mul	tiply line 1 by line 11)	\$53,710
	TOTAL COST TO TRANSPORT AND DISPO DECONTAMINATION FLUID AS A BULK LIG and 12) (Enter total on Worksheet TS-13, I	QUID (Add lines 6, 10,	\$56,071

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.
- Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already bee formulated, you may bypass this step and enter that number directly on line 5.
- d Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure	1	
2	Cost of certification of closure per unitb	\$	
TOTAL COST OF CERTIFICATION OF CLOSURE (Multiply line 1 by line 2) (Enter total on Worksheet TS-1, line 14)			\$3,640

- ^a Facilities closing multiple tanks in the same manner at the same time should incur cost of certification of closure only once.
- ^a Determine the total number of samples to be analyzed at the time of closure. The number of QC samples
- typically is estimated tain 20 des the total of the polynomial of the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK LEFT IN PLACE AT CLOSURE - CAPACITY 35,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 35,000 Gallons - Left in Place -Ignitable Waste

	SUMMARY WORKSHEET				
of closure might inte effect clos	Activity the activities listed below are conducted routinely as part of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of tional activities are listed in italic type.	Worksheet Number	Cost (\$)		
1.	Removal of Waste	TS-3	644		
2.	Tank System Purging (ignitible wastes only)	TS-4	799		
3.	Flushing the Tank and Piping	TS-5	1,288		
4.	Disassembly and Loading	TS-6			
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	5,556		
9.	Sampling and Analysis	TS-11	7,529		
10.	Transportation	TS-12	6,525		
11.	Treatment and Disposal	TS-13	56,071		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		78,412		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	ts, excluding	7,841		
14.	Certification of Closure	TS-14	3,640		
15.	15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)				
16.	Contingency Allowance (approximately 20% of closure coexpenses, and cost of certification of closure) (Multiply lin	osts, engineering ne 15 by 0.20)	17,979		
TOTAL	COST OF CLOSURE (add lines 15 and 16)		\$107,872		

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	35,084	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	526.3	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply line	e 2 by line 3)	\$526
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	8.5	work hrs	
9	Labor cost to purge tank system (Multiply line	6 by line 8)	\$273
	AL COST OF TANK SYSTEM PURGING (Add line forksheet TS-1, line 2)	s 4 and 9)	(Enter total	\$799

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMA TANK RI	ATING WORKSHEET EMOVED AT CLOSU	'S FOR CLOSURE O	DF A TANK SYSTEM

Facility Name: 35,000 Gallons - Removed at Closure

	SUMMARY WORKSHEET				
of closure might into effect clo	Activity the activities listed below are conducted routinely as part e of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of tional activities are listed in italic type.	Worksheet Number	Cost (\$)		
1.	Removal of Waste	TS-3	644		
2.	Tank System Purging (ignitible wastes only)	TS-4			
3.	Flushing the Tank and Piping	TS-5	1,288		
4.	Disassembly and Loading	TS-6	4,816		
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	5,556		
9.	Sampling and Analysis	TS-11	7,529		
10.	Transportation	TS-12	6,525		
11.	Treatment and Disposal	TS-13	56,071		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		82,429		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	8,243			
14.	Certification of Closure	TS-14	3,640		
15.	Subtotal (Add engineering expenses and cost of certification closure costs) (Add lines 12, 13, and 14)	on of closure to	94,312		
16.	Contingency Allowance (approximately 20% of closure continuous and cost of certification of closure) (Multiply line)	osts, engineering ne 15 by 0.20)	18,862		
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$113,174		

DISASSEMBLY AND LOADING - Page 1 of 2

This worksheet can be used to determine the costs of disassembling and loading above ground or onground tanks and ancillary piping. $^{\rm a}$

1 DISA	SSEMBLY OF ANCILLARY PIPING			
1.A	Length of ancillary piping to be disassembled (Enter from worksheet TS-2, line 1.C)	485.2	ft	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	level of PPE	
1.C	Labor and equipment cost per work hour ^c	\$		
1.D	Work rate required to disassemble one ft of pipe ^d		work hr/ft	
1.E	Number of hours required to disassemble ancillary piping (Multiply line 1.A by line 1.D) (One hour minimum; round up to the halfhour)	73.0	work hrs	
1.F	Cost to Disassemble Ancillary Piping (Multiply	line 1.C b	y line 1.E)	\$3,243
2 LOAD	DING			
2.A	Capacity of tank (Enter from worksheet TS-2, line 1.B)	35,000	gal	
2.B	Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	level of PPE	
2.C	Labor and equipment cost per work houre	\$		
2.D	Work rate required to load tank per gallon capacity ^f		work hr/ gal capacity	
2.E	Number of hours required to load tank (Multiply line 2.A by line 2.D) (One hour minimum; round up to the half-hour)	35.0	work hrs	
	, ,	2.F Cost to Load Tank (Multiply line 2.C by line 2.E)		
2.F	Cost to Load Tank (Multiply line 2.C by line 2.	E)		\$1,573

DISASSEMBLY AND LOADING - Page 2 of 2

- Owners and operators of in-ground and underground tank systems are not eligible to use standard permits.
- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to disassemble ancillary piping.
- d Enter the estimated number of work hours required to disassemble one foot of ancillary piping. If, for example, it will take 10 minutes to disassemble each foot of ancillary piping, enter a work rate of 0.167 (10 divided by 60) for disassembling the piping. If an estimate of the total number of hours required to disassemble the piping has already been formulated, you may bypass this step and enter that number directly on line 1.E.
- Enter the estimated cost per work hour of all labor and equipment needed to load components of the onground or aboveground tank system. In addition to costs for labor, this cost should include the average cost per work hour of rental of all equipment and purchase of all supplies needed to conduct this activity.
- Enter the estimated number of work hours per gallon of capacity required to load the components of the on-ground or aboveground tank system. If, for example, it will take 1 minute for every gallon of capacity to load components of the tank system, enter a work rate of 0.017 (1 divided by 60) for loading the system. If an estimate of the total number of hours required to load the tank system has already been formulated, you may bypass this step and enter that number directly on line 2.E.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK REMOVED AT CLOSURE - CAPACITY 35,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 35,000 Gallons - Removed at Closure -Ignitable Waste

	SUMMARY WORKSHEET				
of closure might inte effect clo	Activity the activities listed below are conducted routinely as part of tank systems. The owner or operator, however, and or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of tional activities are listed in italic type.	Worksheet Number	Cost (\$)		
1.	Removal of Waste	TS-3	644		
2.	Tank System Purging (ignitible wastes only)	TS-4	799		
3.	Flushing the Tank and Piping	TS-5	1,288		
4.	Disassembly and Loading	TS-6	4,816		
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	5,556		
9.	Sampling and Analysis	TS-11	7,529		
10.	Transportation	TS-12	6,525		
11.	Treatment and Disposal	TS-13	56,071		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		83,228		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	8,323			
14.	Certification of Closure	TS-14	3,640		
15.	15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)				
16.	Contingency Allowance (approximately 20% of closure continuous and cost of certification of closure) (Multiply line)	osts, engineering ne 15 by 0.20)	19,038		
TOTAL	L COST OF CLOSURE (add lines 15 and 16)		\$114,229		

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	35,084	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	526.3	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply line	e 2 by line 3)	\$526
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	8.5	work hrs	
9	Labor cost to purge tank system (Multiply line	6 by line 8)	\$273
	AL COST OF TANK SYSTEM PURGING (Add line forksheet TS-1, line 2)	s 4 and 9)	(Enter total	\$799

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYST TANK LEFT IN PLACE AT CLOSURE - CAPACITY 40,000 GALLONS	EM

Facility Name: 40,000 Gallons - Left in Place

	SUMMARY WORKSHEET				
of closure might into effect clo	Activity Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number				
1.	Removal of Waste	TS-3	751		
2.	Tank System Purging (ignitible wastes only)	TS-4			
3.	Flushing the Tank and Piping	TS-5	1,503		
4.	Disassembly and Loading	TS-6			
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	6,210		
9.	Sampling and Analysis	TS-11	8,546		
10.	Transportation	TS-12	6,525		
11.	Treatment and Disposal	TS-13	63,445		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		86,980		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	8,698		
14.	Certification of Closure	TS-14	3,640		
15.	15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)				
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			19,864		
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$119,182		

INVENTORY - Page 1 of 2

The information entered in this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the cost of closure for tank systems. If the design characteristics of the tank system to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures, soils, and materials to be removed. Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete all sections of this inventory worksheet.

UNIT DESCRIPTION AND MAXIMUM PERMITTED CAPACITY Describe the unit to determine the cost of the activities to be conducted to close it.					
Describe	e the unit to determine the cost of the activ	vities to be con	ducted to	close it.	
1.A	Type of tank system (aboveground or on-ground) ^b				
1.B	Maximum permitted capacity of tank	40,000	gal		
1.C	Total length of ancillary piping	554.5	ft		
1.D	Maximum capacity of ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the capacity of ancillary piping)	96	gal		
1.E	Maximum capacity of tank and ancillary piping (Add lines 1.B and 1.C)	40,096	gal		
1.F	Vault			t system (external to	tank)
2 INTERIC	OR SURFACE AREA OF TANK SYSTEM				
Determi	ne the interior surface area of the tank syst	tem to determir	ne costs of	decontamination.	
2.A	Interior surface area of tank (Refer to Page 4 of 5 of this worksheet for guidance on estimating the interior surface area of a tank.)	1,701.0	ft²		
2.B	Ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the interior surface area of ancillary piping.)	299.4	ft²		
2.C	Surface Area of Tank System (Add lines	2.A and 2.B)		2,000.4	ft²
2.D	2.D Surface Area of Tank System in yd² (Divide line 2.C by 9)			222.3	yd²

INVENTORY - Page 2 of 2

3 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Determine the surface area of the secondary containment system pad to calculate costs for decontaminating and demolishing the pad. Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure.

3.A	Length	ft		
3.B	Width	ft		
3.C	Surface Area of Secondary Containment Sline 3.A by line 3.B)	2,514.2	ft²	
3.D	Surface Area of Secondary Containment System Pad in yd ² (Divide line 3.C by 9)			yd²

4 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Calculate the volume of the secondary containment system pad to determine the cost of removing the pad. Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure.

4.A	Thickness	ft	
4.B	Thickness in yards (Divide line 4.A by 3)	yd	
4.C	Volume of Secondary Containment Syste line 3.D by line 4.B)	m Pad in yd³ (Multiply	yd³

5 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM BERM

Calculate the interior surface area of the secondary containment system berm, or curbing, to determine the cost of decontaminating and demolishing the berm. Demolition of the secondary containment system berm is an additional activity that might be conducted if the owner or operator intends to demolish the berm at the time of closure.

5.A	Length	ft	
5.B	Height	ft	
5.C	Surface Area of Secondary Containment line 5.A by line 5.B)	ft²	
5.D	Surface Area of Secondary Containment System Berm in yd ² (Divide line 5.C by 9)		yd²

- For example, if a secondary containment system pad is circular in shape rather than rectangular, the user would be unable to calculate the surface area of that pad using the method prescribed in section 2 of this inventory worksheet. Rather, the surface area of such a pad could be calculated using the equation πr^2 .
- Owners and operators of in-ground and underground storage tanks are not eligible to use standardized permits.

REMOVAL OF WASTE - Page 1 of 1

1	Maximum volume of waste to be removed from the tank and ancillary piping (Enter from worksheet TS-2, line 1.E)	40,096	gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hour ^b	\$		
4	Work rate required to remove waste from tank and ancillary piping ^c		work hr/gal	
5	Number of hours required to remove waste from tank and ancillary piping (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	7.0	work hrs	
	L COST OF REMOVAL OF WASTE FROM TANK G (Multiply line 3 by line 5) (Enter total on Works	\$751		

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to remove waste from the unit.
- Enter the estimated number of hours required to remove one gallon of waste from the tank system. If, for example, it will take 1 minute to remove each gallon of waste from the system, enter a work rate of 0.017 (1 divided by 60) for removing the waste. If an estimate of the total number of hours required to remove waste from the tank and ancillary piping has already been formulated, you may bypass this step and enter that number directly on line 5.

FLUSHING THE TANK AND PIPING - Page 1 of 2

1	Maximum capacity of the tank and ancillary piping (Enter from Worksheet TS-2, line 1.E)	40,096	gal	
2	Number of times tank and ancillary piping will be flushed (if unknown, assume 1)	1		
3	Total volume of flushing solution (Multiply line 1 by line 2)	40,096	gal	
4	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
5	Labor and equipment cost per work hour ^b	\$		
6	Work rate required to flush tank and ancillary piping ^c		work hr/gal	
7	Number of hours required to flush tank and ancillary piping (Multiply line 3 by line 6) (One hour minimum; round up to the halfhour)	14.0	work hrs	
8	Subtotal of labor and equipment costs to flush piping (Multiply line 5 by line 7)	•		\$1,503
9	Total volume of flushing solution (Enter from line 3). (The flushing solution generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B (for water-based flushing solution) or TS-12 and TS-13A (for a solvent solution) to calculate the transportation, treatment, and disposal cost. If the flushing solution is to be placed in drums, complete lines 10 through 12.)	40,096	gal	
10	Number of drums required to contain flushing solution (Divide line 9 by 55 gallons per drum; round up to the nearest whole number)		drums	
11	Cost of one drum	\$	/drum	
12	Cost of drums needed to contain flushing solution (Multiply line 10 by line 11)			\$0
	L COST OF FLUSHING OF TANK AND ANCILLAR 2) (Enter total on Worksheet TS-1, line 3)	RY PIPING	(Add lines 8	\$1,503

Remember to calculate costs for transporting, treating, and disposing of the wastes in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If the wastes are to be managed as a bulk liquid, use worksheet TS-13B.

FLUSHING THE TANK AND PIPING - Page 2 of 2

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to flush the tank system.
- Enter the estimated number of hours required to flush the tank system for every one gallon of flushing solution. If, for example, it will take 1 minute for every gallon of flushing solution to flush the tank system, enter a work rate of 0.017 (1 divided by 60) for flushing the tank and piping. If an estimate of the total number of hours required to flush the tank and piping has already been formulated, you may bypass this step and enter that number directly on line 7.

DECONTAMINATION SUMMARY SHEET - Page 1 of 1

Facility Name: 40,000 Gallons - Left In Place

D	DECONTAMINATION SUMMARY WORKSHEET				
	Activity	Worksheet Number	Cost (\$)		
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	TS-10A	6,210		
2.	Decontamination of Unit by Sandblasting	TS-10B			
3.	Decontamination of Heavy Equipment	TS-10C			
TOTA Work	\$6,210				

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Annual francisco de la contractica del Contractica de la Contracti			
1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	2,000.4	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	54.5	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply I			\$3,675
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²) ^d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	8,002	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$3,675		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

TANK SYSTEMS

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	2,514.2	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft ²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	68.0	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply I			\$2,535
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²) ^d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	10,057	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$2,535		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: 40,000 Gallons - Left in Place

SAMPLING AND ANALYSIS SUMMARY WORKSHEET					
	Worksheet Activity Number Cost (\$)				
1.	Drilling and Subsurface Soil Sampling & Analysis	TS-11B			
2.	Concrete Core Sampling & Analysis	TS-11C	458		
3.	Wipe Sampling & Analysis	TS-11D	972		
4.	Surface Water/Liquid Sampling & Analysis	TS-11E	6,099		
5.	Soil/Sludge/Sediment Sampling & Analysis	TS-11F	1,017		
TOTA on W	\$8,546				

SAMPLE INVENTORY - Page 1 of 2

The information entered on this inventory worksheet will be used in completing the appropriate worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES							
In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.							
1	Number of Subsurface Soil Samples						
	Boring Diameter:						
		boreholes	samples/borehole	total samples			
2 NUMBEI	R OF CONCRETE CORE	SAMPLES					
		mber of concrete core sa s to be collected in the b	amples to be collected fo ox provided.	r each individual unit.			
2	Number of Concrete C	Core Samples		1 total samples			
3 NUMBEI	R OF WIPE SAMPLES						
	In the space below, identify the number of sample locations and the number of wipe samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.						
3	Number of Wipe Samples						
		locations samples/location 2 total samples					
4 NUMBER OF SURFACE WATER/LIQUID SAMPLES							
In the space below, identify the number of grab samples taken on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.							
4	Number of Aqueous Samples						
	locations samples/location 12 total samples						

SAMPLE INVENTORY - Page 2 of 2

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES							
In the space below, identify the number of grab samples taken of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.							
5	5 Number of Nonaqueous Samples						
		locations	samples/location	2	total samples		

CONCRETE CORE SAMPLING & ANALYSIS - Page 1 of 1

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1 COLLECTING CONCRETE CORE SAMPLES					
1.A	Number of concrete core samples to be collected (Enter from worksheet TS-11A, line 2)	1	core samples		
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE		
1.C	Labor and equipment cost per work hourb	\$			
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6-inches ^c		work hr/sample		
1.E	Number of hours required to drill 3-inch- diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	1	work hrs		
1.F	Cost to Collect Concrete Core Samples (Multip	1.C by line 1.E)	\$41		
2 ANAI	LYZING CONCRETE CORE SAMPLES				
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	\$139	9 /event		
2.B	Enter the number of sampling events	3	events		
2.C	2.C Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)			\$417	
TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on worksheet TS-11, line 2)				\$458	

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.
- Enter the estimated number of work hours required to drill a 3-inch diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

WIPE SAMPLING & ANALYSIS - Page 1 of 1

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1 COLLECTING WIPE SAMPLES					
1.A	Number of wipe samples to be collected (Enter from worksheet TS-11A, line 3)	2	samples		
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE		
1.C	Labor and equipment cost per work hourb	\$			
1.D	Work rate required to collect one sample ^c		work hr/sample		
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0	work hrs		
1.F	Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)			\$138	
2 ANALY	2 ANALYZING WIPE SAMPLES				
2.A	Cost of analysis per sampling event for wipe samples (Enter from Page 2 of 2 of this worksheet)	\$139) /event		
2.B	Number of sampling events	6	events		
2.C	C Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)			\$834	
_	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet TS-11, line 3)			\$972	

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.
- Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SURFACE WATER/LIQUID SAMPLING & ANALYSIS - Page 1 of 1

Surface water/liquid samples are grab samples taken from lakes, rivers, or ponds, and samples taken of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLE	1 COLLECTING SURFACE WATER/LIQUID SAMPLES					
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet TS-11A, line 4) 12 samples					
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	level of PPE				
1.C	Labor and equipment cost per work hourb					
1.D	Work rate required to collect one sample ^c	١	work hr/sample			
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D) 12.0 work hrs					
1.F	Cost to Collect Surface Water/Liquid Samples line 1.E)	\$1,095				
2 ANAI	2 ANALYZING SURFACE WATER/LIQUID SAMPLES					
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	\$139	/event			
2.B	Number of sampling events	36	events			
2.C	Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)			\$5,004		
WAT	TOTAL COST OF COLLECTION AND ANALYSIS OF SURFACE WATER/LIQUID SAMPLES (Add lines 1.F to line 2.C) (Enter total on Worksheet TS-11, line 4)			\$6,099		

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect surface water/liquid samples.
- Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SOIL/SLUDGE/SEDIMENT SAMPLING & ANALYSIS - Page 1 of 1

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

4 00	4 COLUENTINO COLUENTATA CAMPLES					
1 CO	LLECTING SOIL/SLUDGE/SEDIMENT SAMPLES	I				
1. <i>P</i>	Number of soil/sludge/sediment samples to be collected (Enter from worksheet TS-11A, line 5)	2	samples			
1.B	<u> </u>	D	level of PPE			
1.0	Labor and equipment cost per work hourb	\$				
1.0	Work rate required to collect one sample ^c		work hr/sample			
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	2	work hrs			
1.F	Cost to Collect Soil/Sludge/Sediment Samples line 1.E)	\$183				
2 AN	2 ANALYZING SOIL/SLUDGE/SEDIMENT SAMPLES					
2.4	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	\$139	9 /event			
2.B	Number of sampling events	6	events			
2.0	.C Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)			\$834		
so	TAL COST OF COLLECTION AND ANALYSIS OF L/SLUDGE/SEDIMENT SAMPLES (Add lines 1.F at rksheet TS-11, line 5)	\$1,017				

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.
- Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

TRANSPORTATION OF WASTE - Page 1 of 1

Depending on the activities being conducted, it may not be necessary to complete all sections of the transportation worksheet.

1 TRANSPORTATION OF WASTE IN DRUMS					
1.A	Number of drums of waste		drums		
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	\$	/truckload		
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)		truckloads		
1.D	Cost to Transport Waste In Drums (Multiply lin	e 1.B by lin	ne 1.C)	\$	
2 TRAN	ISPORTATION OF BULK LIQUIDS				
2.A	Gallons of liquid waste	40,096	gal		
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	\$	/truckload		
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	6	truckloads		
2.D	Cost to Transport Bulk Liquid Waste (Multiply	\$6,525			
3 TRAN	ISPORTATION OF BULK WASTE				
3.A	Number of waste debris boxes		debris boxes		
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	\$	/truckload		
3.C	Cost to Transport Bulk Solid Waste (assume of hauled on each truck) (Multiply line 3.A by line	\$			
TOTAL COST TO TRANSPORT WASTE (Add lines 1.D, 2.D, and 3.C) (Enter total on Worksheet TS-1, line 10)				\$6,525	

TREATMENT AND DISPOSAL SUMMARY SHEET - Page 1 of 1

Facility Name: 40,000 Gallons - Left in Place

SUMMARY WORKSHEET				
	Activity	Worksheet Number	Cost (\$)	
1.	Treatment and Disposal of Waste	TS-13A		
2.	Transportation and Disposal of Decontamination Fluids	TS-13B	63,445	
	COST OF TREATMENT AND DISPOSAL (Add li al on Worksheet TS-1, line 11)	nes 1 and 2)	\$63,445	

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 1 of 2

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. gal gal gal gal gal gal	58,155 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D level of PPE	
3	Labor and equipment cost per work hour ^b	\$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon) ^c	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	4 work hours	
6	Subtotal of labor and equipment cost to pum to a holding tank (multiply line 3 by line 5)	p decontamination fluid	\$192
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	\$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	6 tanks	
10	Subtotal of tank rental costs (Multiply lines 7	, 8, and 9)	\$2,190
11	Removal cost per gallon of bulk liquid ^d	\$ /gal	
12	Subtotal of removal cost for bulk liquids (Mul	tiply line 1 by line 11)	\$61,063
	TOTAL COST TO TRANSPORT AND DISPO DECONTAMINATION FLUID AS A BULK LIG and 12) (Enter total on Worksheet TS-13, I	QUID (Add lines 6, 10,	\$63,445

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.
- Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already bee formulated, you may bypass this step and enter that number directly on line 5.
- d Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure	1	
2	Cost of certification of closure per unitb	\$	
	\$3,640		

- ^a Facilities closing multiple tanks in the same manner at the same time should incur cost of certification of closure only once.
- ^a Determine the total number of samples to be analyzed at the time of closure. The number of QC samples
- typically is estimated tain 20 des the total of the polynomial of the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK LEFT IN PLACE AT CLOSURE - CAPACITY 40,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 40,000 Gallons - Left in Place -Ignitable Waste

	SUMMARY WORKSHEET			
of closure might into effect clo	Activity the activities listed below are conducted routinely as part e of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of itional activities are listed in italic type.	Worksheet Number	Cost (\$)	
1.	Removal of Waste	TS-3	751	
2.	Tank System Purging (ignitible wastes only)	TS-4	923	
3.	Flushing the Tank and Piping	TS-5	1,503	
4.	Disassembly and Loading	TS-6		
5.	Demolition and Removal of Containment System	TS-7		
6.	Removal of Soil	TS-8		
7.	Backfill	TS-9		
8.	Decontamination	TS-10	6,210	
9.	Sampling and Analysis	TS-11	8,546	
10.	Transportation	TS-12	6,525	
11.	Treatment and Disposal	TS-13	63,445	
12.	Subtotal of Closure Costs (Add lines 1 through 11)		87,903	
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	8,790	
14.	Certification of Closure	TS-14	3,640	
15.				
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			20,067	
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$120,400	

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	40,096	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	601.4	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply line	e 2 by line 3)	\$601
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	10.0	work hrs	
9	Labor cost to purge tank system (Multiply line	6 by line 8))	\$322
	AL COST OF TANK SYSTEM PURGING (Add line orksheet TS-1, line 2)	s 4 and 9) ((Enter total	\$923

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMA	ATING WORKSHEE	TS FOR CLOSUR	RE OF A TANK SYS	тем
TANK RI	EMOVED AT CLOS	URE - CAPACITY	Y 40,000 GALLONS	

Facility Name: 40,000 Gallons - Removed at Closure

	SUMMARY WORKSHEET			
of closure might inte effect clos	Activity the activities listed below are conducted routinely as part of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of tional activities are listed in italic type.	Worksheet Number	Cost (\$)	
1.	Removal of Waste	TS-3	751	
2.	Tank System Purging (ignitible wastes only)	TS-4		
3.	Flushing the Tank and Piping	TS-5	1,503	
4.	Disassembly and Loading	TS-6	5,508	
5.	Demolition and Removal of Containment System	TS-7		
6.	Removal of Soil	TS-8		
7.	Backfill	TS-9		
8.	Decontamination	TS-10	6,210	
9.	Sampling and Analysis	TS-11	8,546	
10.	Transportation	TS-12	6,525	
11.	Treatment and Disposal	TS-13	63,445	
12.	Subtotal of Closure Costs (Add lines 1 through 11)		92,488	
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	9,249	
14.	Certification of Closure	TS-14	3,640	
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			105,377	
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			21,075	
TOTAL	COST OF CLOSURE (add lines 15 and 16)		\$126,452	

DISASSEMBLY AND LOADING - Page 1 of 2

This worksheet can be used to determine the costs of disassembling and loading above ground or onground tanks and ancillary piping. $^{\rm a}$

1 DICA	SCENARI V OF ANOUL ARV DIDING			
1.A	Length of ancillary piping to be disassembled (Enter from worksheet TS-2, line 1.C)	554.5	ft	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	level of PPE	
1.C	Labor and equipment cost per work hour ^c	\$		
1.D	Work rate required to disassemble one ft of pipe ^d		work hr/ft	
1.E	Number of hours required to disassemble ancillary piping (Multiply line 1.A by line 1.D) (One hour minimum; round up to the half-hour)	83.5	work hrs	
	Cost to Disassemble Ancillary Piping (Multiply	line 1 C h	v line 1.E)	\$3,710
1.F	Cost to Disasserrible Afficiliary Piping (Multiply	IIIIC 1.0 D	<i>j</i>	
1.F 2 LOAI 2.A	DING Capacity of tank (Enter from worksheet			
2 LOAI	DING	40,000 D	gal level of PPE	
2 LOAI	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity	40,000	gal	
2 LOAI 2.A 2.B	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b	40,000 D	gal	
2 LOAI 2.A 2.B 2.C	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon	40,000 D	gal level of PPE work hr/	
2.A 2.B 2.C 2.D	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon capacity ^f Number of hours required to load tank (Multiply line 2.A by line 2.D) (One hour	40,000 D \$	gal level of PPE work hr/ gal capacity	\$1,798

DISASSEMBLY AND LOADING - Page 2 of 2

- Owners and operators of in-ground and underground tank systems are not eligible to use standard permits.
- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to disassemble ancillary piping.
- d Enter the estimated number of work hours required to disassemble one foot of ancillary piping. If, for example, it will take 10 minutes to disassemble each foot of ancillary piping, enter a work rate of 0.167 (10 divided by 60) for disassembling the piping. If an estimate of the total number of hours required to disassemble the piping has already been formulated, you may bypass this step and enter that number directly on line 1.E.
- Enter the estimated cost per work hour of all labor and equipment needed to load components of the onground or aboveground tank system. In addition to costs for labor, this cost should include the average cost per work hour of rental of all equipment and purchase of all supplies needed to conduct this activity.
- Enter the estimated number of work hours per gallon of capacity required to load the components of the on-ground or aboveground tank system. If, for example, it will take 1 minute for every gallon of capacity to load components of the tank system, enter a work rate of 0.017 (1 divided by 60) for loading the system. If an estimate of the total number of hours required to load the tank system has already been formulated, you may bypass this step and enter that number directly on line 2.E.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK REMOVED AT CLOSURE - CAPACITY 40,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 40,000 Gallons - Removed at Closure -Ignitable Waste

	SUMMARY WORKSHEET				
Some of	Activity the activities listed below are conducted routinely as part of tank systems. The owner or operator, however,				
might into	end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of itional activities are listed in italic type.	Worksheet Number	Cost (\$)		
1.	Removal of Waste	TS-3	751		
2.	Tank System Purging (ignitible wastes only)	TS-4	923		
3.	Flushing the Tank and Piping	TS-5	1,503		
4.	Disassembly and Loading	TS-6	5,508		
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	6,210		
9.	Sampling and Analysis	TS-11	8,546		
10.	Transportation	TS-12	6,525		
11.	Treatment and Disposal	TS-13	63,445		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		93,411		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	9,341		
14.	Certification of Closure	TS-14	3,640		
15.	15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)				
16.					
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$127,670		

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	40,096	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	601.4	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply line	e 2 by line 3)	\$601
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	10.	work hrs	
9	Labor cost to purge tank system (Multiply line	6 by line 8)	\$322
	AL COST OF TANK SYSTEM PURGING (Add line orksheet TS-1, line 2)	s 4 and 9)	(Enter total	\$923

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYST TANK LEFT IN PLACE AT CLOSURE - CAPACITY 45,000 GALLON	ΓEM S

Facility Name: 45,000 Gallons - Left in Place

	SUMMARY WORKSHEET			
of closure might inte effect clo	Activity the activities listed below are conducted routinely as part e of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of tional activities are listed in italic type.	Worksheet Number	Cost (\$)	
1.	Removal of Waste	TS-3	859	
2.	Tank System Purging (ignitible wastes only)	TS-4		
3.	Flushing the Tank and Piping	TS-5	1,664	
4.	Disassembly and Loading	TS-6		
5.	Demolition and Removal of Containment System	TS-7		
6.	Removal of Soil	TS-8		
7.	Backfill	TS-9		
8.	Decontamination	TS-10	6,797	
9.	Sampling and Analysis	TS-11	9,563	
10.	Transportation	TS-12	7,613	
11.	Treatment and Disposal	TS-13	71,081	
12.	Subtotal of Closure Costs (Add lines 1 through 11)		97,577	
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	9,758	
14.	Certification of Closure	TS-14	3,640	
15.				
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			22,195	
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$133,170	

INVENTORY - Page 1 of 2

The information entered in this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the cost of closure for tank systems. If the design characteristics of the tank system to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures, soils, and materials to be removed. Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete all sections of this inventory worksheet.

1 UNIT D	ESCRIPTION AND MAXIMUM PERMITTED	CAPACITY			
Describ	e the unit to determine the cost of the activ	vities to be cor	nducted to	close it.	
1.A	Type of tank system (aboveground or on-ground) ^b				
1.B	Maximum permitted capacity of tank	45,000	gal		
1.C	Total length of ancillary piping	623.8	ft		
1.D	Maximum capacity of ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the capacity of ancillary piping)	109	gal		
1.E	Maximum capacity of tank and ancillary piping (Add lines 1.B and 1.C)	45,109	gal		
1.F	Type of secondary containment system	Double-wall tank Vault Lined containment system (e Other (explain)			nal to tank)
2 INTERIO	OR SURFACE AREA OF TANK SYSTEM				
Determ	ine the interior surface area of the tank sys	tem to determi	ne costs of	decontamination	nn.
2.A	Interior surface area of tank (Refer to Page 4 of 5 of this worksheet for guidance on estimating the interior surface area of a tank.)	1,822.0	ft ²		
2.B	Ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the interior surface area of ancillary piping.)	336.9	ft²		
2.C	Surface Area of Tank System (Add lines 2.A and 2.B)			2,158.9	ft²
2.D	Surface Area of Tank System in yd ² (Divide line 2.C by 9)			239.9	yd²

INVENTORY - Page 2 of 2

3 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Determine the surface area of the secondary containment system pad to calculate costs for decontaminating and demolishing the pad. Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure.

3.A	Length	ft		
3.B	Width	ft		
3.C	Surface Area of Secondary Containment System Pad (Multiply line 3.A by line 3.B)			ft²
3.D	Surface Area of Secondary Containment (Divide line 3.C by 9)	314.3	yd²	

4 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Calculate the volume of the secondary containment system pad to determine the cost of removing the pad. Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure.

4.A	Thickness	ft	
4.B	Thickness in yards (Divide line 4.A by 3)	yd	
4.C	Volume of Secondary Containment System Pad in yd³ (Multiply line 3.D by line 4.B)		yd³

5 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM BERM

Calculate the interior surface area of the secondary containment system berm, or curbing, to determine the cost of decontaminating and demolishing the berm. Demolition of the secondary containment system berm is an additional activity that might be conducted if the owner or operator intends to demolish the berm at the time of closure.

5.A	Length	ft	
5.B	Height	ft	
5.C	Surface Area of Secondary Containment System Berm (Multiply line 5.A by line 5.B)		ft²
5.D	Surface Area of Secondary Containment System Berm in yd ² (Divide line 5.C by 9)		yd²

- For example, if a secondary containment system pad is circular in shape rather than rectangular, the user would be unable to calculate the surface area of that pad using the method prescribed in section 2 of this inventory worksheet. Rather, the surface area of such a pad could be calculated using the equation πr^2 .
- Owners and operators of in-ground and underground storage tanks are not eligible to use standardized permits.

REMOVAL OF WASTE - Page 1 of 1

1	Maximum volume of waste to be removed from the tank and ancillary piping (Enter from worksheet TS-2, line 1.E)	45,109	gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hour ^b	\$		
4	Work rate required to remove waste from tank and ancillary piping ^c		work hr/gal	
5	Number of hours required to remove waste from tank and ancillary piping (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	8.0	work hrs	
	L COST OF REMOVAL OF WASTE FROM TANK G (Multiply line 3 by line 5) (Enter total on Works	\$859		

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to remove waste from the unit.
- Enter the estimated number of hours required to remove one gallon of waste from the tank system. If, for example, it will take 1 minute to remove each gallon of waste from the system, enter a work rate of 0.017 (1 divided by 60) for removing the waste. If an estimate of the total number of hours required to remove waste from the tank and ancillary piping has already been formulated, you may bypass this step and enter that number directly on line 5.

FLUSHING THE TANK AND PIPING - Page 1 of 2

1	Maximum capacity of the tank and ancillary piping (Enter from Worksheet TS-2, line 1.E)	45,109	gal	
2	Number of times tank and ancillary piping will be flushed (if unknown, assume 1)	1		
3	Total volume of flushing solution (Multiply line 1 by line 2)	45,109	gal	
4	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
5	Labor and equipment cost per work hour ^b	\$		
6	Work rate required to flush tank and ancillary piping ^c		work hr/gal	
7	Number of hours required to flush tank and ancillary piping (Multiply line 3 by line 6) (One hour minimum; round up to the halfhour)	15.5	work hrs	
8	Subtotal of labor and equipment costs to flush piping (Multiply line 5 by line 7)	\$1,664		
9	Total volume of flushing solution (Enter from line 3). (The flushing solution generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B (for water-based flushing solution) or TS-12 and TS-13A (for a solvent solution) to calculate the transportation, treatment, and disposal cost. If the flushing solution is to be placed in drums, complete lines 10 through 12.)	45,109	gal	
10	Number of drums required to contain flushing solution (Divide line 9 by 55 gallons per drum; round up to the nearest whole number)		drums	
11	Cost of one drum	\$	/drum	
12	Cost of drums needed to contain flushing solution 11)	\$0		
	L COST OF FLUSHING OF TANK AND ANCILLAR 2) (Enter total on Worksheet TS-1, line 3)	\$1,664		

Remember to calculate costs for transporting, treating, and disposing of the wastes in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If the wastes are to be managed as a bulk liquid, use worksheet TS-13B.

FLUSHING THE TANK AND PIPING - Page 2 of 2

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to flush the tank system.
- Enter the estimated number of hours required to flush the tank system for every one gallon of flushing solution. If, for example, it will take 1 minute for every gallon of flushing solution to flush the tank system, enter a work rate of 0.017 (1 divided by 60) for flushing the tank and piping. If an estimate of the total number of hours required to flush the tank and piping has already been formulated, you may bypass this step and enter that number directly on line 7.

DECONTAMINATION SUMMARY SHEET - Page 1 of 1

Facility Name: 45,000 Gallons - Left In Place

D	DECONTAMINATION SUMMARY WORKSHEET			
	Activity	Worksheet Number	Cost (\$)	
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	TS-10A	6,797	
2.	Decontamination of Unit by Sandblasting	TS-10B		
3.	Decontamination of Heavy Equipment	TS-10C		
TOTA Work	\$6,797			

TANK SYSTEMS

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	2,158.9	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	58.5	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply I			\$3,945
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²)d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	8,636	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$3,945		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

TANK SYSTEMS

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	2,828.5	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	76.5	work hrs	
6	Subtotal of labor and equipment cost to decontaminate the unit by steam cleaning or pressure washing (Multiply line 3 by line 5)			\$2,852
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²) ^d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	11,314	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$2,852		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: 45,000 Gallons - Left in Place

SAMPLING AND ANALYSIS SUMMARY WORKSHEET					
	Activity	Worksheet Number	Cost (\$)		
1.	Drilling and Subsurface Soil Sampling & Analysis	TS-11B			
2.	Concrete Core Sampling & Analysis	TS-11C	458		
3.	Wipe Sampling & Analysis	TS-11D	972		
4.	Surface Water/Liquid Sampling & Analysis	TS-11E	7,116		
5.	5. Soil/Sludge/Sediment Sampling & Analysis TS-11F				
TOTA on W	\$9,563				

SAMPLE INVENTORY - Page 1 of 2

The information entered on this inventory worksheet will be used in completing the appropriate worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES						
In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.						
1	Number of Subsurface Soil Samples					
	Boring Diameter:	Boring Diameter:				
		boreholes	samples/borehole	total samples		
2 NUMBE	R OF CONCRETE CORE	SAMPLES				
		mber of concrete core so to be collected in the b	amples to be collected foox provided.	r each individual unit.		
2	Number of Concrete C	Core Samples		1 total samples		
3 NUMBE	R OF WIPE SAMPLES					
			s and the number of wip umber of samples to be c			
3	Number of Wipe Samp	oles				
		locations	samples/location	2 total samples		
4 NUMBE	R OF SURFACE WATER	/LIQUID SAMPLES				
In the space below, identify the number of grab samples taken on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.						
4	Number of Aqueous S	amples				
		locations	samples/location	14 total samples		

SAMPLE INVENTORY - Page 2 of 2

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES							
In the space below, identify the number of grab samples taken of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.							
5	Number of Nonaqueous Samples						
		locations	samples/location	2	total samples		

CONCRETE CORE SAMPLING & ANALYSIS - Page 1 of 1

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1 COLL	1 COLLECTING CONCRETE CORE SAMPLES					
1.A	Number of concrete core samples to be collected (Enter from worksheet TS-11A, line 2)	1	core samples			
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE			
1.C	Labor and equipment cost per work hourb	\$				
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6-inches ^c		work hr/sample			
1.E	Number of hours required to drill 3-inch- diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	1	work hrs			
1.F Cost to Collect Concrete Core Samples (Multiply line 1.C by line 1.E)			\$41			
2 ANAI	LYZING CONCRETE CORE SAMPLES					
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	\$139	9 /event			
2.B	Enter the number of sampling events	3	events			
2.C	2.C Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)			\$417		
TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on worksheet TS-11, line 2)				\$458		

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.
- Enter the estimated number of work hours required to drill a 3-inch diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

WIPE SAMPLING & ANALYSIS - Page 1 of 1

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1 COLLECTING WIPE SAMPLES					
1.A	Number of wipe samples to be collected (Enter from worksheet TS-11A, line 3)	2	samples		
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE		
1.C	Labor and equipment cost per work hourb	\$			
1.D	Work rate required to collect one sample ^c		work hr/sample		
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0	work hrs		
1.F	Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)			\$138	
2 ANALY	ZING WIPE SAMPLES				
2.A	Cost of analysis per sampling event for wipe samples (Enter from Page 2 of 2 of this worksheet)	\$139) /event		
2.B	Number of sampling events	6	events		
2.C	Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)			\$834	
_	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet TS-11, line 3)			\$972	

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.
- Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SURFACE WATER/LIQUID SAMPLING & ANALYSIS - Page 1 of 1

Surface water/liquid samples are grab samples taken from lakes, rivers, or ponds, and samples taken of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLECTING SURFACE WATER/LIQUID SAMPLES						
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet TS-11A, line 4)	14	samples			
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a		level of PPE			
1.C	Labor and equipment cost per work hourb					
1.D	Work rate required to collect one sample ^c	٧	work hr/sample			
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	14.0	work hrs			
1.F	1.F Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)			\$1,278		
2 ANAI	2 ANALYZING SURFACE WATER/LIQUID SAMPLES					
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	\$139	/event			
2.B	Number of sampling events	42	events			
2.C	Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)			\$5,838		
WAT	AL COST OF COLLECTION AND ANALYSIS OF SER/LIQUID SAMPLES (Add lines 1.F to line 2.C) sheet TS-11, line 4)	\$7,116				

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect surface water/liquid samples.
- Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SOIL/SLUDGE/SEDIMENT SAMPLING & ANALYSIS - Page 1 of 1

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

4 00	4 COLLECTING COLLICITION (CEDIMENT CAMPLES						
1 CO	1 COLLECTING SOIL/SLUDGE/SEDIMENT SAMPLES						
1. <i>P</i>	Number of soil/sludge/sediment samples to be collected (Enter from worksheet TS-11A, line 5)	2	samples				
1.B	<u> </u>	D	level of PPE				
1.0	Labor and equipment cost per work hourb	\$					
1.0	Work rate required to collect one sample ^c		work hr/sample				
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	2	work hrs				
1.F	Cost to Collect Soil/Sludge/Sediment Samples (Multiply line 1.C by line 1.E)			\$183			
2 AN	2 ANALYZING SOIL/SLUDGE/SEDIMENT SAMPLES						
2.4	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	\$139	9 /event				
2.B	Number of sampling events	6	events				
2.0	Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)			\$834			
so	TAL COST OF COLLECTION AND ANALYSIS OF L/SLUDGE/SEDIMENT SAMPLES (Add lines 1.F at rksheet TS-11, line 5)	\$1,017					

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.
- Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

TRANSPORTATION OF WASTE - Page 1 of 1

Depending on the activities being conducted, it may not be necessary to complete all sections of the transportation worksheet.

1 TRAN	1 TRANSPORTATION OF WASTE IN DRUMS						
1.A	Number of drums of waste		drums				
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	\$	/truckload				
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)		truckloads				
1.D	Cost to Transport Waste In Drums (Multiply lin	e 1.B by line	e 1.C)	\$			
2 TRAN	ISPORTATION OF BULK LIQUIDS						
2.A	Gallons of liquid waste	45,109	gal				
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	\$	/truckload				
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	7	truckloads				
2.D	Cost to Transport Bulk Liquid Waste (Multiply line 2.B by line 2.C)			\$7,613			
3 TRAN	3 TRANSPORTATION OF BULK WASTE						
3.A	Number of waste debris boxes	(debris boxes				
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	\$	/truckload				
3.C	Cost to Transport Bulk Solid Waste (assume of hauled on each truck) (Multiply line 3.A by line	\$					
TOTAL COST TO TRANSPORT WASTE (Add lines 1.D, 2.D, and 3.C) (Enter total on Worksheet TS-1, line 10)				\$7,613			

TREATMENT AND DISPOSAL SUMMARY SHEET - Page 1 of 1

Facility Name: 45,000 Gallons - Left in Place

SUMMARY WORKSHEET				
	Cost (\$)			
1.	Treatment and Disposal of Waste	TS-13A		
2.	Transportation and Disposal of Decontamination Fluids	TS-13B	71,081	
TOTAL (Enter tot	\$71,081			

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 1 of 2

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. gal gal gal gal gal gal	65,059 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D level of PPE	
3	Labor and equipment cost per work hour ^b	\$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon) ^c	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	5 work hours	
6	Subtotal of labor and equipment cost to pum to a holding tank (multiply line 3 by line 5)	p decontamination fluid	\$214
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	\$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	7 tanks	
10	Subtotal of tank rental costs (Multiply lines 7	, 8, and 9)	\$2,555
11	Removal cost per gallon of bulk liquid ^d	\$ /gal	
12	Subtotal of removal cost for bulk liquids (Mul	tiply line 1 by line 11)	\$68,312
	TOTAL COST TO TRANSPORT AND DISPO DECONTAMINATION FLUID AS A BULK LIG and 12) (Enter total on Worksheet TS-13, I	QUID (Add lines 6, 10,	\$71,081

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.
- Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already bee formulated, you may bypass this step and enter that number directly on line 5.
- d Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure	1	
2	Cost of certification of closure per unitb	\$	
	\$3,640		

- ^a Facilities closing multiple tanks in the same manner at the same time should incur cost of certification of closure only once.
- ^a Determine the total number of samples to be analyzed at the time of closure. The number of QC samples
- by typically is estimated tain 20 des the formable of samples wind early likes by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK LEFT IN PLACE AT CLOSURE - CAPACITY 45,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 45,000 Gallons - Left in Place -Ignitable Waste

	SUMMARY WORKSHEET				
of closure might into effect clo	Activity Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number				
1.	Removal of Waste	TS-3	859		
2.	Tank System Purging (ignitible wastes only)	TS-4	1,031		
3.	Flushing the Tank and Piping	TS-5	1,664		
4.	Disassembly and Loading	TS-6			
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	6,797		
9.	Sampling and Analysis	TS-11	9,563		
10.	Transportation	TS-12	7,613		
11.	Treatment and Disposal	TS-13	71,081		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		98,608		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	9,861		
14.	Certification of Closure	TS-14	3,640		
15.	15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)				
16.	22,422				
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$134,531		

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	45,109	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	676.6	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply line	e 2 by line 3)	\$677
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	11.0	work hrs	
9	Labor cost to purge tank system (Multiply line 6 by line 8)			\$354
	AL COST OF TANK SYSTEM PURGING (Add line forksheet TS-1, line 2)	\$1,031		

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMATING WORKSHEETS FOR CLOSURE O TANK REMOVED AT CLOSURE - CAPACITY 45,	OF A TANK SYSTEM 000 GALLONS

Facility Name: 45,000 Gallons - Removed at Closure

	SUMMARY WORKSHEET				
of closure might into effect clo	Activity the activities listed below are conducted routinely as part e of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of itional activities are listed in italic type.	Worksheet Number	Cost (\$)		
1.	Removal of Waste	TS-3	859		
2.	Tank System Purging (ignitible wastes only)	TS-4			
3.	Flushing the Tank and Piping	TS-5	1,664		
4.	Disassembly and Loading	TS-6	6,198		
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	6,797		
9.	Sampling and Analysis	TS-11	9,563		
10.	Transportation	TS-12	7,613		
11.	Treatment and Disposal	TS-13	71,081		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		103,775		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	10,378		
14.	Certification of Closure	TS-14	3,640		
15.	117,793				
16.	23,559				
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$141,352		

DISASSEMBLY AND LOADING - Page 1 of 2

This worksheet can be used to determine the costs of disassembling and loading above ground or onground tanks and ancillary piping. $^{\rm a}$

I DISA	SSEMBLY OF ANCILLARY PIPING			
1.A	Length of ancillary piping to be disassembled (Enter from worksheet TS-2, line 1.C)	623.8	ft	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	level of PPE	
1.C	Labor and equipment cost per work hour ^c	\$		
1.D	Work rate required to disassemble one ft of pipe ^d		work hr/ft	
1.E	Number of hours required to disassemble ancillary piping (Multiply line 1.A by line 1.D) (One hour minimum; round up to the halfhour)	94.0	work hrs	
1.F	Cost to Disassemble Ancillary Piping (Multiply	line 1.C by	y line 1.E)	\$4,176
2 LOAD	DING			
2.A				
∠.A	Capacity of tank (Enter from worksheet TS-2, line 1.B)	45,000	gal	
2.A 2.B		45,000 D	gal level of PPE	
	TS-2, line 1.B) Level of PPE assumed for this activity		-	
2.B	TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	-	
2.B 2.C	TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon	D	level of PPE work hr/	
2.B 2.C 2.D	TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon capacity ^f Number of hours required to load tank (Multiply line 2.A by line 2.D) (One hour	D \$ 45.0	level of PPE work hr/ gal capacity	\$2,022

DISASSEMBLY AND LOADING - Page 2 of 2

- Owners and operators of in-ground and underground tank systems are not eligible to use standard permits.
- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to disassemble ancillary piping.
- d Enter the estimated number of work hours required to disassemble one foot of ancillary piping. If, for example, it will take 10 minutes to disassemble each foot of ancillary piping, enter a work rate of 0.167 (10 divided by 60) for disassembling the piping. If an estimate of the total number of hours required to disassemble the piping has already been formulated, you may bypass this step and enter that number directly on line 1.E.
- Enter the estimated cost per work hour of all labor and equipment needed to load components of the onground or aboveground tank system. In addition to costs for labor, this cost should include the average cost per work hour of rental of all equipment and purchase of all supplies needed to conduct this activity.
- Enter the estimated number of work hours per gallon of capacity required to load the components of the on-ground or aboveground tank system. If, for example, it will take 1 minute for every gallon of capacity to load components of the tank system, enter a work rate of 0.017 (1 divided by 60) for loading the system. If an estimate of the total number of hours required to load the tank system has already been formulated, you may bypass this step and enter that number directly on line 2.E.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK REMOVED AT CLOSURE - CAPACITY 45,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 45,000 Gallons - Removed at Closure -Ignitable Waste

	SUMMARY WORKSHEET				
of closure might into effect clo	Activity Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number				
1.	Removal of Waste	TS-3	859		
2.	Tank System Purging (ignitible wastes only)	TS-4	1,031		
3.	Flushing the Tank and Piping	TS-5	1,664		
4.	Disassembly and Loading	TS-6	6,198		
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	6,797		
9.	Sampling and Analysis	TS-11	9,563		
10.	Transportation	TS-12	7,613		
11.	Treatment and Disposal	TS-13	71,081		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		104,806		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	10,481		
14.	Certification of Closure	TS-14	3,640		
15.	118,927				
16.	23,785				
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$142,712		

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	45,109	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	676.6	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply line	e 2 by line 3)	\$677
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	11.0	work hrs	
9	Labor cost to purge tank system (Multiply line 6 by line 8)			\$354
	AL COST OF TANK SYSTEM PURGING (Add line forksheet TS-1, line 2)	\$1,031		

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A T TANK LEFT IN PLACE AT CLOSURE - CAPACITY 50,000	CANK SYSTEM O GALLONS

Facility Name: 50,000 Gallons - Left in Place

	SUMMARY WORKSHEET				
of closure might into effect clo	Activity Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type. Worksheet Number				
1.	Removal of Waste	TS-3	966		
2.	Tank System Purging (ignitible wastes only)	TS-4			
3.	Flushing the Tank and Piping	TS-5	1,878		
4.	Disassembly and Loading	TS-6			
5.	Demolition and Removal of Containment System	TS-7			
6.	Removal of Soil	TS-8			
7.	Backfill	TS-9			
8.	Decontamination	TS-10	7,485		
9.	Sampling and Analysis	TS-11	10,556		
10.	Transportation	TS-12	8,700		
11.	Treatment and Disposal	TS-13	78,869		
12.	Subtotal of Closure Costs (Add lines 1 through 11)		108,454		
13.	Engineering Expenses (approximately 10% of closure cost certification of closure [Multiply line 12 by 0.10])	s, excluding	10,845		
14.	Certification of Closure	TS-14	3,640		
15.	on of closure to	122,939			
16.	24,588				
TOTA	L COST OF CLOSURE (add lines 15 and 16)		\$147,527		

INVENTORY - Page 1 of 2

The information entered in this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the cost of closure for tank systems. If the design characteristics of the tank system to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures, soils, and materials to be removed. Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete all sections of this inventory worksheet.

Describe	e the unit to determine the cost of the activ	ities to be con	ducted to d	close it.		
1.A	Type of tank system (aboveground or on-ground) ^b					
1.B	Maximum permitted capacity of tank	50,000	gal			
1.C	Total length of ancillary piping	693.1	ft			
1.D	Maximum capacity of ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the capacity of ancillary piping)	121	gal			
1.E	Maximum capacity of tank and ancillary piping (Add lines 1.B and 1.C)	50,121	gal			
1.F	Type of secondary containment system	Vault Lined c	-wall tank containmen explain)	t system (external t	o tank)	
2 INTERIC	OR SURFACE AREA OF TANK SYSTEM					
Determi	ne the interior surface area of the tank syst	tem to determin	ne costs of	decontamination.		
2.A	Interior surface area of tank (Refer to Page 4 of 5 of this worksheet for guidance on estimating the interior surface area of a tank.)	1,980.0	ft²			
2.B	Ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the interior surface area of ancillary piping.)	374.3	ft²			
2.C	Surface Area of Tank System (Add lines	2.A and 2.B)		2,354.3	ft²	
2.D	Surface Area of Tank System in yd ² (Divi	de line 2.C by	9)	261.6	yd²	

INVENTORY - Page 2 of 2

3 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Determine the surface area of the secondary containment system pad to calculate costs for decontaminating and demolishing the pad. Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure.

3.A	Length	ft		
3.B	Width	ft		
3.C	Surface Area of Secondary Containment Sline 3.A by line 3.B)	3,142.7	ft²	
3.D	Surface Area of Secondary Containment (Divide line 3.C by 9)	349.2	yd²	

4 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Calculate the volume of the secondary containment system pad to determine the cost of removing the pad. Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure.

4.A	Thickness	ft	
4.B	Thickness in yards (Divide line 4.A by 3)	yd	
4.C	Volume of Secondary Containment Syste line 3.D by line 4.B)	m Pad in yd³ (Multiply	yd³

5 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM BERM

Calculate the interior surface area of the secondary containment system berm, or curbing, to determine the cost of decontaminating and demolishing the berm. Demolition of the secondary containment system berm is an additional activity that might be conducted if the owner or operator intends to demolish the berm at the time of closure.

5.A	Length	ft	
5.B	Height	ft	
5.C	Surface Area of Secondary Containment line 5.A by line 5.B)	System Berm (Multiply	ft²
5.D	Surface Area of Secondary Containment (Divide line 5.C by 9)	System Berm in yd ²	yd²

- For example, if a secondary containment system pad is circular in shape rather than rectangular, the user would be unable to calculate the surface area of that pad using the method prescribed in section 2 of this inventory worksheet. Rather, the surface area of such a pad could be calculated using the equation πr^2 .
- Owners and operators of in-ground and underground storage tanks are not eligible to use standardized permits.

REMOVAL OF WASTE - Page 1 of 1

1	Maximum volume of waste to be removed from the tank and ancillary piping (Enter from worksheet TS-2, line 1.E)	50,121	gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate required to remove waste from tank and ancillary piping ^c		work hr/gal	
5	Number of hours required to remove waste from tank and ancillary piping (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	9.0	work hrs	
	L COST OF REMOVAL OF WASTE FROM TANK 6 (Multiply line 3 by line 5) (Enter total on Works	\$966		

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to remove waste from the unit.
- Enter the estimated number of hours required to remove one gallon of waste from the tank system. If, for example, it will take 1 minute to remove each gallon of waste from the system, enter a work rate of 0.017 (1 divided by 60) for removing the waste. If an estimate of the total number of hours required to remove waste from the tank and ancillary piping has already been formulated, you may bypass this step and enter that number directly on line 5.

FLUSHING THE TANK AND PIPING - Page 1 of 2

1	Maximum capacity of the tank and ancillary piping (Enter from Worksheet TS-2, line 1.E)	50,121	gal	
2	Number of times tank and ancillary piping will be flushed (if unknown, assume 1)	1		
3	Total volume of flushing solution (Multiply line 1 by line 2)	50,121	gal	
4	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
5	Labor and equipment cost per work hour ^b	\$		
6	Work rate required to flush tank and ancillary piping ^c		work hr/gal	
7	Number of hours required to flush tank and ancillary piping (Multiply line 3 by line 6) (One hour minimum; round up to the halfhour)	17.5	work hrs	
8	Subtotal of labor and equipment costs to flush piping (Multiply line 5 by line 7)			\$1,878
9	Total volume of flushing solution (Enter from line 3). (The flushing solution generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B (for water-based flushing solution) or TS-12 and TS-13A (for a solvent solution) to calculate the transportation, treatment, and disposal cost. If the flushing solution is to be placed in drums, complete lines 10 through 12.)	50,121	gal	
10	Number of drums required to contain flushing solution (Divide line 9 by 55 gallons per drum; round up to the nearest whole number)		drums	
11	Cost of one drum	\$	/drum	
12	Cost of drums needed to contain flushing solution 11)	\$0		
	L COST OF FLUSHING OF TANK AND ANCILLAR 2) (Enter total on Worksheet TS-1, line 3)	ry Piping	(Add lines 8	\$1,878

Remember to calculate costs for transporting, treating, and disposing of the wastes in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If the wastes are to be managed as a bulk liquid, use worksheet TS-13B.

FLUSHING THE TANK AND PIPING - Page 2 of 2

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to flush the tank system.
- Enter the estimated number of hours required to flush the tank system for every one gallon of flushing solution. If, for example, it will take 1 minute for every gallon of flushing solution to flush the tank system, enter a work rate of 0.017 (1 divided by 60) for flushing the tank and piping. If an estimate of the total number of hours required to flush the tank and piping has already been formulated, you may bypass this step and enter that number directly on line 7.

DECONTAMINATION SUMMARY SHEET - Page 1 of 1

Facility Name: 50,000 Gallons - Left In Place

D	DECONTAMINATION SUMMARY WORKSHEET				
	Activity	Worksheet Number	Cost (\$)		
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	TS-10A	7,485		
2.	Decontamination of Unit by Sandblasting	TS-10B			
3.	Decontamination of Heavy Equipment	TS-10C			
TOTA Work	\$7,485				

TANK SYSTEMS

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2.C, 3.C,			
	5.C, and 7.A)	2,354.3	ft ²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft ^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	64.0	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply I			\$4,316
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²) ^d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	9,417	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$4,316		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter			
	from Worksheet TS-2; add lines 2.C, 3.C, 5.C, and 7.A)	3,142.7	ft²	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
3	Labor and equipment cost per work hourb	\$		
4	Work rate to steam clean or pressure wash one ft^{2c}		work hrs/ft²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	85.0	work hrs	
6	Subtotal of labor and equipment cost to decon steam cleaning or pressure washing (Multiply I			\$3,169
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft²) ^d (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	12,571	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)		drums	
9	Cost of one drum	\$	/drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)			\$
PRES	AL COST OF DECONTAMINATION OF UNIT BY S SURE WASHING (For bulk liquids, enter from lin s, add lines 6 and 10.) (Enter total on Workshee	\$3,169		

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.
- Enter the estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already ben formulated, you may bypass this step and enter that number directly on line 5.
- U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: 50,000 Gallons - Left in Place

SAMPLING AND ANALYSIS SUMMARY WORKSHEET					
	Activity	Worksheet Number	Cost (\$)		
1.	Drilling and Subsurface Soil Sampling & Analysis	TS-11B			
2.	Concrete Core Sampling & Analysis	TS-11C	458		
3.	Wipe Sampling & Analysis	TS-11D	1,457		
4.	Surface Water/Liquid Sampling & Analysis	TS-11E	7,624		
5.	5. Soil/Sludge/Sediment Sampling & Analysis TS-11F				
TOTA on W	\$10,556				

SAMPLE INVENTORY - Page 1 of 2

The information entered on this inventory worksheet will be used in completing the appropriate worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBEI	1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES				
In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.					
1	Number of Subsurface Soil Samples				
	Boring Diameter:				
		boreholes	samples/borehole	total samples	
2 NUMBEI	R OF CONCRETE CORE	SAMPLES			
		mber of concrete core sa s to be collected in the b	amples to be collected fo ox provided.	r each individual unit.	
2	Number of Concrete C	Core Samples		1 total samples	
3 NUMBEI	R OF WIPE SAMPLES				
			s and the number of wip mber of samples to be c		
3	Number of Wipe Samp	bles			
		locations	samples/location	3 total samples	
4 NUMBEI	R OF SURFACE WATER	/LIQUID SAMPLES			
In the space below, identify the number of grab samples taken on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.					
4	Number of Aqueous S	amples			
		locations	samples/location	15 total samples	

SAMPLE INVENTORY - Page 2 of 2

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES					
In the space below, identify the number of grab samples taken of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.					
5	Number of Nonaqueou	is Samples			
		locations	samples/location	2	total samples

CONCRETE CORE SAMPLING & ANALYSIS - Page 1 of 1

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1 COLLECTING CONCRETE CORE SAMPLES				
1.A	Number of concrete core samples to be collected (Enter from worksheet TS-11A, line 2)	1	core samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
1.C	Labor and equipment cost per work hourb	\$		
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6-inches ^c		work hr/sample	
1.E	Number of hours required to drill 3-inch- diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	1	work hrs	
1.F	1.F Cost to Collect Concrete Core Samples (Multiply line 1.C by line 1.E)			\$41
2 ANAI	LYZING CONCRETE CORE SAMPLES			
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	\$139	9 /event	
2.B	Enter the number of sampling events	3	events	
2.C	2.C Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)			\$417
TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on worksheet TS-11, line 2)				\$458

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.
- Enter the estimated number of work hours required to drill a 3-inch diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

WIPE SAMPLING & ANALYSIS - Page 1 of 1

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1 COLLECTING WIPE SAMPLES				
1.A	Number of wipe samples to be collected (Enter from worksheet TS-11A, line 3)	3	samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a	В	level of PPE	
1.C	Labor and equipment cost per work hourb	\$		
1.D	Work rate required to collect one sample ^c		work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.5	work hrs	
1.F	1.F Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)			\$206
2 ANALY	ZING WIPE SAMPLES			
2.A	Cost of analysis per sampling event for wipe samples (Enter from Page 2 of 2 of this worksheet)	\$139) /event	
2.B	Number of sampling events	9	events	
2.C	Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)			\$1,251
_	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet TS-11, line 3)			\$1,457

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- b Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.
- Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SURFACE WATER/LIQUID SAMPLING & ANALYSIS - Page 1 of 1

Surface water/liquid samples are grab samples taken from lakes, rivers, or ponds, and samples taken of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLECTING SURFACE WATER/LIQUID SAMPLES					
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet TS-11A, line 4)	15	samples		
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^a		level of PPE		
1.C	Labor and equipment cost per work hourb				
1.D	Work rate required to collect one sample ^c	٧	work hr/sample		
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	15.0	work hrs		
1.F	1.F Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)			\$1,369	
2 ANAI	YZING SURFACE WATER/LIQUID SAMPLES				
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	\$139	/event		
2.B	Number of sampling events	45	events		
2.C	Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)			\$6,255	
WAT	AL COST OF COLLECTION AND ANALYSIS OF SER/LIQUID SAMPLES (Add lines 1.F to line 2.C) sheet TS-11, line 4)	\$7,624			

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect surface water/liquid samples.
- Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

SOIL/SLUDGE/SEDIMENT SAMPLING & ANALYSIS - Page 1 of 1

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

4 00	4. COLUENTINO COLUENTINO COLUENTA CAMPLEO				
1 CO	1 COLLECTING SOIL/SLUDGE/SEDIMENT SAMPLES				
1. <i>P</i>	Number of soil/sludge/sediment samples to be collected (Enter from worksheet TS-11A, line 5)	2	samples		
1.B	<u> </u>	D	level of PPE		
1.0	Labor and equipment cost per work hourb	\$			
1.0	Work rate required to collect one sample ^c		work hr/sample		
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	2	work hrs		
1.F	Cost to Collect Soil/Sludge/Sediment Samples (Multiply line 1.C by line 1.E)			\$183	
2 AN	ALYZING SOIL/SLUDGE/SEDIMENT SAMPLES				
2.4	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	\$139	9 /event		
2.B	Number of sampling events	6	events		
2.0	C Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)			\$834	
so	TAL COST OF COLLECTION AND ANALYSIS OF L/SLUDGE/SEDIMENT SAMPLES (Add lines 1.F at rksheet TS-11, line 5)	\$1,017			

- ^a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.
- Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

TRANSPORTATION OF WASTE - Page 1 of 1

Depending on the activities being conducted, it may not be necessary to complete all sections of the transportation worksheet.

 1				
1 TRANSPORTATION OF WASTE IN DRUMS				
1.A	Number of drums of waste		drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)		truckloads	
1.D	Cost to Transport Waste In Drums (Multiply lin	e 1.B by line	e 1.C)	\$
2 TRAN	ISPORTATION OF BULK LIQUIDS			
2.A	Gallons of liquid waste	50,121	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	8	truckloads	
2.D	Cost to Transport Bulk Liquid Waste (Multiply	line 2.B by li	ne 2.C)	\$8,700
3 TRAN	ISPORTATION OF BULK WASTE			
3.A	Number of waste debris boxes	d	lebris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	\$	/truckload	
3.C	Cost to Transport Bulk Solid Waste (assume one debris box can be hauled on each truck) (Multiply line 3.A by line 3.B)			\$
TOTAL COST TO TRANSPORT WASTE (Add lines 1.D, 2.D, and 3.C) (Enter total on Worksheet TS-1, line 10)				\$8,700

TREATMENT AND DISPOSAL SUMMARY SHEET - Page 1 of 1

Facility Name: 50,000 Gallons - Left in Place

SUMMARY WORKSHEET			
	Activity	Worksheet Number	Cost (\$)
1.	Treatment and Disposal of Waste	TS-13A	
2.	Transportation and Disposal of Decontamination Fluids	TS-13B	78,869
TOTAL COST OF TREATMENT AND DISPOSAL (Add lines 1 and 2) (Enter total on Worksheet TS-1, line 11) \$7			

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 1 of 2

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. gal gal gal gal gal	72,109 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D level of PPE	
3	Labor and equipment cost per work hourb	\$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon) ^c	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	5 work hours	
6	Subtotal of labor and equipment cost to pum to a holding tank (multiply line 3 by line 5)	p decontamination fluid	\$235
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	\$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	8 tanks	
10	Subtotal of tank rental costs (Multiply lines 7	\$2,920	
11	Removal cost per gallon of bulk liquid ^d	\$ /gal	
12	Subtotal of removal cost for bulk liquids (Multiply line 1 by line 11)		
	\$78,869		

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 2 of 2

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.
- Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already bee formulated, you may bypass this step and enter that number directly on line 5.
- d Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure	1	
2	Cost of certification of closure per unitb	\$	
	\$3,640		

- ^a Facilities closing multiple tanks in the same manner at the same time should incur cost of certification of closure only once.
- ^a Determine the total number of samples to be analyzed at the time of closure. The number of QC samples
- by typically is estimated tain 20 des the formable of samples wind early likes by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK LEFT IN PLACE AT CLOSURE - CAPACITY 50,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 50,000 Gallons - Left in Place -Ignitable Waste

SUMMARY WORKSHEET				
	Activity			
of closure might inte effect clos	the activities listed below are conducted routinely as part of tank systems. The owner or operator, however, and or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of tional activities are listed in italic type.	Worksheet Number	Cost (\$)	
1.	Removal of Waste	TS-3	966	
2.	Tank System Purging (ignitible wastes only)	TS-4	1,154	
3.	Flushing the Tank and Piping	TS-5	1,878	
4.	Disassembly and Loading	TS-6		
5.	Demolition and Removal of Containment System	TS-7		
6.	Removal of Soil	TS-8		
7.	Backfill	TS-9		
8.	Decontamination	TS-10	7,485	
9.	Sampling and Analysis	TS-11	10,556	
10.	Transportation	TS-12	8,700	
11.	Treatment and Disposal	TS-13	78,869	
12.	12. Subtotal of Closure Costs (Add lines 1 through 11) 109,608			
13.				
14.	Certification of Closure	TS-14	3,640	
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			124,209	
Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			24,842	
TOTAL	\$149,051			

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	50,121	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	751.8	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply line	e 2 by line 3)	\$752
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	12.5	work hrs	
9	Labor cost to purge tank system (Multiply line 6 by line 8)			\$402
	AL COST OF TANK SYSTEM PURGING (Add line orksheet TS-1, line 2)	\$1,154		

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.

COST ESTIMATING W TANK REMOVE	VORKSHEETS FOR CLOSU D AT CLOSURE - CAPACIT	JRE OF A TANK SYSTEM FY 50,000 GALLONS

Facility Name: 50,000 Gallons - Removed at Closure

SUMMARY WORKSHEET				
of closure might into effect clo	Activity the activities listed below are conducted routinely as part e of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of itional activities are listed in italic type.	Worksheet Number	Cost (\$)	
1.	Removal of Waste	TS-3	966	
2.	Tank System Purging (ignitible wastes only)	TS-4		
3.	Flushing the Tank and Piping	TS-5	1,878	
4.	Disassembly and Loading	TS-6	6,868	
5.	Demolition and Removal of Containment System	TS-7		
6.	Removal of Soil	TS-8		
7.	Backfill	TS-9		
8.	Decontamination	TS-10	7,485	
9.	Sampling and Analysis	TS-11	10,556	
10.	Transportation	TS-12	8,700	
11.	Treatment and Disposal	TS-13	78,869	
12.	12. Subtotal of Closure Costs (Add lines 1 through 11) 115,3			
13.				
14.	Certification of Closure	TS-14	3,640	
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			130,494	
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			26,099	
TOTAL COST OF CLOSURE (add lines 15 and 16)			\$156,593	

DISASSEMBLY AND LOADING - Page 1 of 2

This worksheet can be used to determine the costs of disassembling and loading above ground or onground tanks and ancillary piping. $^{\rm a}$

1 DISA	SSEMBLY OF ANCILLARY PIPING			
1.A	Length of ancillary piping to be disassembled (Enter from worksheet TS-2, line 1.C)	693.1	ft	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	level of PPE	
1.C	Labor and equipment cost per work hour ^c	\$		
1.D	Work rate required to disassemble one ft of pipe ^d		work hr/ft	
1.E	Number of hours required to disassemble ancillary piping (Multiply line 1.A by line 1.D) (One hour minimum; round up to the half-hour)	104.0	work hrs	
1.F	Cost to Disassemble Ancillary Piping (Multiply	line 1.C b	y line 1.E)	\$4,621
2 LOAI 2.A	Capacity of tank (Enter from worksheet	50,000		
		50,000 D	gal level of PPE	
2.A	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity		g	
2.A 2.B	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b	D	g	
2.A 2.B 2.C	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon	D	level of PPE work hr/	
2.A 2.B 2.C 2.D	Capacity of tank (Enter from worksheet TS-2, line 1.B) Level of PPE assumed for this activity (protection level D, C, or B) ^b Labor and equipment cost per work hour ^e Work rate required to load tank per gallon capacity ^f Number of hours required to load tank (Multiply line 2.A by line 2.D) (One hour	D \$ 50.0	level of PPE work hr/ gal capacity	\$2,247

DISASSEMBLY AND LOADING - Page 2 of 2

- Owners and operators of in-ground and underground tank systems are not eligible to use standard permits.
- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- Enter the estimated cost per work hour of all labor and equipment needed to disassemble ancillary piping.
- d Enter the estimated number of work hours required to disassemble one foot of ancillary piping. If, for example, it will take 10 minutes to disassemble each foot of ancillary piping, enter a work rate of 0.167 (10 divided by 60) for disassembling the piping. If an estimate of the total number of hours required to disassemble the piping has already been formulated, you may bypass this step and enter that number directly on line 1.E.
- Enter the estimated cost per work hour of all labor and equipment needed to load components of the onground or aboveground tank system. In addition to costs for labor, this cost should include the average cost per work hour of rental of all equipment and purchase of all supplies needed to conduct this activity.
- Enter the estimated number of work hours per gallon of capacity required to load the components of the on-ground or aboveground tank system. If, for example, it will take 1 minute for every gallon of capacity to load components of the tank system, enter a work rate of 0.017 (1 divided by 60) for loading the system. If an estimate of the total number of hours required to load the tank system has already been formulated, you may bypass this step and enter that number directly on line 2.E.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A TANK SYSTEM TANK REMOVED AT CLOSURE - CAPACITY 50,000 GALLONS CONTAINED IGNITABLE WASTE

Facility Name: 50,000 Gallons - Removed at Closure -Ignitable Waste

SUMMARY WORKSHEET				
of closure might inte effect clo	Activity the activities listed below are conducted routinely as part e of tank systems. The owner or operator, however, end or be required to conduct additional activities to sure at the unit. Worksheets for estimating the costs of itional activities are listed in italic type.	Worksheet Number	Cost (\$)	
1.	Removal of Waste	TS-3	966	
2.	Tank System Purging (ignitible wastes only)	TS-4	1,154	
3.	Flushing the Tank and Piping	TS-5	1,878	
4.	Disassembly and Loading	TS-6	6,868	
5.	Demolition and Removal of Containment System	TS-7		
6.	Removal of Soil	TS-8		
7.	Backfill	TS-9		
8.	Decontamination	TS-10	7,485	
9.	Sampling and Analysis	TS-11	10,556	
10.	Transportation	TS-12	8,700	
11.	Treatment and Disposal	TS-13	78,869	
12.	12. Subtotal of Closure Costs (Add lines 1 through 11) 116,476			
13.				
14.	Certification of Closure	TS-14	3,640	
15. Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 12, 13, and 14)			131,764	
16. Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 15 by 0.20)			26,353	
TOTA		\$158,117		

TANK SYSTEM PURGING - Page 1 of 1

Complete this worksheet only if the contents of the tank system are ignitible.

1	Maximum capacity of tank system (Enter from Worksheet TS-2, line 1.E)	50,121	gal	
2	Amount of dry ice needed to purge tank system (Divide line 1 by 100 gal and multiply value by 1.5 lbs)	751.8	lbs	
3	Cost of one pound of dry ice	\$	/lb	
4	Cost of dry ice needed to purge tank system (I	Multiply line	e 2 by line 3)	\$752
5	Level of PPE assumed for this activity (protection level D, C, or B) ^a	D	level of PPE	
6	Labor cost per work hour ^b	\$		
7	Work rate required to purge tank system per gal capacity ^c		work hr/ gal capacity	
8	Number of hours required to purge tank system (Multiply line 1 by line 7) (One hour minimum; round up to the half-hour)	12.5	work hrs	
9	Labor cost to purge tank system (Multiply line 6 by line 8)			\$402
	AL COST OF TANK SYSTEM PURGING (Add line orksheet TS-1, line 2)	\$1,154		

- Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- ^b Enter the estimated cost per work hour of all labor and equipment needed to purge the tank system.
- Enter the estimated number of hours required to purge the tank system for every gallon of capacity. If, for example, it will take 1 minute for every gallon of capacity to purge the tank system, enter a work rate of 0.017 (one divided by 60) for purging the tank system. If an estimate of the total number of hours required to purge the tank system has already been formulated, you may bypass this step and enter that number directly on line 8.